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JOURNAL OF EDUCATIONAL RESEARCH

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JOURNAL *of* EDUCATIONAL RESEARCH

Volume XXI APRIL 1930 Number 4

AN ANALYSIS OF TACT

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Teachers College, Columbia University

ONE might suppose that it is impossible to analyze such an elusive thing as tact if one takes literally the dictionary definition. Webster's dictionary defines tact as, "Ready power of appreciating and doing what is required by circumstances." This quickness of insight which requires a sensing of the various psychological forces which influence members of a group,—the gratifications or rebuffs to one's sense of his own importance—is certainly an elusive skill. Most of us blunder through life without ever realizing the many times a day we tread on people's toes and make them wince through little slights, effronteries, neglects, indignities, and enlargement of our own importance. And even though we were able to sense the effect our acts have on other people it would be extremely difficult for most of us to take ourselves in hand and efface our own sense of importance in such a way as to avoid chilling the euphoria of other people with whom we rub elbows.

And yet, however elusive this skill may be, some people acquire it to a high degree and others clumsily stumble through life without seeming to learn its rudiments. Our psychology makes us believe that if some individuals acquire this skill of being tactful, it does not permanently remain merely a matter of "appreciating the circumstances," but resolves itself into a host of subtle habits. If tact does, to any extent, rest on a basis of habit one ought to be able to tease out these habits and catalogue them. To do so would be extremely important; for once we are able to remove tact from the realm of mystery and say "Here are the habits that tact consists of" we make it easier for people to learn to be tactful.

With this belief, the writer, with the coöperation of a graduate class in psychology and a research class in secondary education,[1] set about

[1] Education 207 H, and Education 335 R. Teachers College, 1927-28.

systematically to analyze tact into separate habits. The first assignment to these classes was to "List as many things as you can that people do when they do not get along well together." The lists that came in contained from three or four to seventy items. Naturally, some misunderstood the assignment and others, not used to this type of analysis, listed very general "traits." The latter were quite useless for our purposes. With these preliminary lists an effort was made to sort the items into classes. Anyone who has not attempted to do this sort of thing cannot appreciate the difficulty. Each item listed such as: making sarcastic remarks; taking the opposite side of a question; failing to give undivided attention; showing that one feels himself not properly appreciated; effusive attention to others; expressing suspicion of the motives of others; and acting bored when others are enthusiastic, seemed to be so singular as to defy grouping or classification. Finally a tentative grouping was effected. The students were then given a series of assignments which were calculated to amplify the items which were turned in on the first request. On successive weeks the two classes were requested to turn in lists of acts which (1) interfere with or annoy other people; (2) belittle the other person; (3) harm others; (4) fail to meet obligations; and (5) overemphasize self. As an aid in conjuring up the items it was suggested that each member of the classes think of friends, relatives, intimate acquaintances, and others with whom they come in contact and try to recall acts or occasions when these individuals caused annoyance or irritation. The result was a number of sets of papers each containing several items which constituted habits going to make up tact. Each of these items was transferred to a separate slip of paper and then began a long and tedious process of sorting and grouping. The final grouping was put in outline form in order to take care of the different degrees of generality of the statements. The items range all the way from the most general such as "Bullying" to the very specific such as "Telling another person that he is looking poorly." Some of the more general headings are amplified by specific illustrations while others are left to the imagination to fill in.

The next step consisted of distributing the list of 853 items to another graduate class in psychology and also to undergraduates in the School of Education of Boston University[2] asking for additional items. Many more items were turned in, both general headings and specific

[2] Through the courtesy of Prof. W. Linwood Chase.

illustrations of items previously listed. All additional items were fitted into the outline which finally contained 1173 items, as follows:

	No. of items
Direct Overemphasis of Self	95
Dominating Another Person or Group	94
Annoying, Disturbing or Irritating Others by Overaction of Self	203
Stealing, Deceiving or Cheating, and other Unethical Practices	140
Overemphasis of Other Persons	16
Depreciating Self	33
Disparagement of Other Persons	146
Unfriendly Acts	107
Actually Bodily Harm or Annoyance to Others	54
Indifference or Neglect of Self	23
Annoying, Disturbing or Irritating Others by Underaction of Self	36
Indifference or Neglect of Other Persons or Groups	164
Permitting Others to Annoy	14
Promises or Engagements	48
Total number of items	1173

The completed list should more justly be called an "analysis of tactlessness" inasmuch as all of the items describe acts that annoy or distress. Of course this list should be exactly complementary to a list of positive facts. It is possible that an assignment which would start a group thinking about the positive evidences of tact would uncover many more items, but these positive evidences have not been neglected in the present list as witnessed by the large number of items beginning "Failing to....".

The last step consisted of having each item rated both for *frequency* and *annoyingness*. In the first place, some of the items occur more frequently than others in the course of ordinary living and insofar as they occur more often they are more important. Secondly, some of the items annoy or distress more than others. It would be valuable to know the relative severity of each item by getting answers to such questions as "How uncomfortable does this item make you feel when it happens to you?".

The following directions were given to those doing this evaluating:

In the accompanying mimeographed bulletin is a list of acts which indicate a lack of *tact* or *social adjustment*. You are asked to assist in evaluating this list by giving your judgment as to the *frequency* and *importance* of these acts.

In the column headed *frequency* write the numbers 1, 2, 3, 4, or 5 to indicate the frequency with which the act is committed or omitted by people in their relations with you.

Write *5* if the event happens several times a day.
4 if the event happens about once a day.
3 if the event happens about once a week.
2 if the event happens about once a month.
1 if the event happens once a year or less often.

Please fill in a rating for every entry, both the main headings and all the subheadings.

In some cases such as "Failing to give credit when credit is due" it is impossible to state how frequently this event is omitted. In these cases enter a rating to indicate how frequently the positive act "Giving credit when credit is due" occurs.

In the column headed annoyance write the numbers 1, 2, 3, 4, or 5 to indicate the *importance* of the event as measured by the amount of *annoyance* it would cause you if it occurred. In this case you will have to imagine the event occurring to you and estimate how it would affect you.

Write *5* if it would annoy you *exceedingly* and give you profound shock or depression.
4 if it would annoy you *considerably* and make you feel uncomfortable for an hour or two.
3 if it would annoy you *somewhat*, perhaps more or less keenly at the moment, but without lasting effects.
2 if it would annoy you *slightly*, but is something that you easily pass over and soon forget.
1 if it causes *practically* no disturbance or annoyance,—a mere trace.

Use the *minus* sign if any of the events have a positive satisfaction value for you—that is, if you really like them.

Please fill in a rating for every entry, both the main headings and all the subheadings.

In some cases such as "Failing to give credit when credit is due" it is not possible to give a rating since one does not know when the omission is made. In such cases consider how satisfying the positive act "Giving credit when credit is due" is, and enter that value instead.

Go through all the items giving your ratings for *frequency* and then go back and give your ratings for *annoyance*. You should find that after doing one or two pages the ratings can be made without much effort.

Forty-six persons did this rating. Some were members of the writer's advanced class in research; some were members of a summer class

in psychology; some were undergraduates in the School of Education of Boston University, and others were relatives, friends, previous students, and colleagues of the writer. The rating took six or more hours to complete.

Finally, average values of the ratings of both frequency and importance were obtained and the product of these averages was computed for each item. This final figure represents the significance or the importance, of the item as a factor in social adjustment. The outline given at the end of this article contains all items having a product of over seven. This means that the item occurs frequently and is annoying when it occurs.

It should be noted that those items finding a place in this short list are *general* items. Specific items such as "being invited to a gathering of young couples and coming with your mother instead of your husband who stays at home to mind the baby" usually occurred with such small frequency that they could not be considered important even though they were rated high for annoyingness. A supplementary list of items rated over 4.00 for annoyingness but which do not appear in the main list because of low frequency is appended.

Although any one person's rating is probably subjective and unreliable it is believed that the final average rating for any item is highly significant. One notes in comparing items that the ratings are sensitive to slight variations in the situation described. Naturally, however, the ratings are influenced by the character of the raters. They represent what would be true for city dwellers and people of middle age rather than children or very old people. Since most of the raters were teachers the ratings may be overemphasized from the teacher's point of view. The raters included members of both sexes but there were more women than men. None of these factors, however, are very influential in determining the ratings as is shown in a study by H. Cason on "Origin and Nature of Common Annoyances" reported at the Ninth International Congress of Psychology.

As we worked with the items in arranging and classifying them several generalizations stood out. Items fall roughly into three general groups according to the type of irritation or annoyance they arouse. In one group belong those which result in actual bodily harm or injury to property. In a second group may be placed those that irritate or annoy but without doing any real damage. Most of the items of this type have to do with restrictions, interruptions, disturbances, monopolization of

another's time or possessions, as well as certain mannerisms that annoy. The irritation in some of these instances is certainly undisguised anger, as would be the response to "Hurrying someone already in haste." In others the response is akin to anger or fear and it may not be far from the truth to say that all items which fall in this group produce direct emotional responses which are at least derivations or implicit responses of anger or fear.

The third group is most interesting, for here belong effronteries of the self. Each of us, apparently, has built up an intricate series of responses to the way in which other people flatter, ignore or disparage our ego or personality. These responses have their roots in infancy. Our first acts are directed toward alleviating such recurrent demands as hunger, thirst, drowsiness, and cold. Some person, usually the mother or father, is *always* concerned with the production of the original satisfaction, so that we learn early to respond to other people. Habits are built up of craving their presence and attention, and of dominating or being dominated by other people in order to achieve what is desired. And parents, meanwhile, are employing a variety of forms of expression such as smiling, scowling, and later flattery and scolding, as they provide or withhold these satisfactions; these forms of expression tend to become associated with the acquirement of the satisfactions. The net result is that these expressions and actions on the part of other people tend to become associated with our satisfactions and deprivations. By the time we become adults these stimulus-response situations have become so generalized that the responses which were originally very definite expressions of satisfaction and annoyance at obtaining or not obtaining what we want have melted into a vague exaltation or depression of the ego or personality. Just as our original explicit speech disappears into a hidden implicit vocalization (i.e., in thinking), so our shouts or coos of pleasure and groans and grunts of displeasure have disappeared into an inner set of responses which we know only as vague feelings of exaltation or depression,—such are the responses to the third group of items in our analysis. When another person ridicules, criticizes, or humiliates us, or even severely ignores us we tend to feel hurt and depressed. It takes praise, congratulations, and attention to make us respond with warmth and elation. Again if our friend talks about himself and his prowess, or emphasizes too heavily the achievement of someone else, it has the same effect as if he ignored us. Finally, if the other person, in compensating for his own failure to achieve, berates and belittles himself in order to

gain our pity and consolation, we read through his imposition and despise him, yet not without experiencing the depressed feeling ourself which comes from being neglected or depreciated.

One other important generalization that a study of the analysis revealed was that tact is not always desirable. The person who never criticizes another, never failed to follow the advice of others, never took the opposite side of the question, or never reported another's faults, would indeed be a remarkable individual, a weak and spineless fellow. Sometimes it is for the good of others to annoy them, to irritate them, to criticize them. He who goes through life without ever giving offense to a soul is not competent to be a parent, a teacher, nor a citizen. If others were perfect and never needed to have their ways shaped or altered one would never need to give offense. But sometimes bluntness and tactlessness is the most valuable thing we can show another person. Likewise, a man is sure to neglect himself and his own interests if he manages to so live as never to offend or annoy other people.

Tact is not an absolute virtue. To so assert is to imply that life never offers conflict of interests. It is where a conflict of interest presents itself that reason should be employed. To go back to our original definition of tact it would seem as though we approach any situation with a set of habit systems. These habits determine in large measure how we will react in any situation. Tact, as it is employed in the course of the day's experiences, is the response of a set of habits. But the situation may be such that two or more habits tend to be called into action at once. There are cues in the situation which have in the past called up different opposing habits. For instance, a child in school has the bad habit of using the word "ain't." The teacher has the tendency to correct him when he uses this word because she is annoyed by it herself and because she, also, believes it her duty as a teacher to correct him so that he will not annoy others. At the same time this teacher has the tendency to not correct him because she knows that correcting him will make him so much more timid in speaking and distrustful of his own ability to speak. When such an issue arises two things may happen. The teacher may let her strongest impulse prevail and criticize or not, according to which impulse is stronger. Or, she may stop and consider the outcomes of either course of action and decide which course is likely to have the more salutary effect and whether there is possibility of compromise. It is preferable, of course, to let reason decide the issue rather than the stronger habit.

The value of this analysis of tact is that it brings tact out of its

former obscurity and mystery and presents it for all to read and study. When parents and teachers know what habits tact consists of they will be in a better position to judge the educative value of a conduct situation. Tact or social adjustment is at the heart of the problem of conduct. On this series of habits depends much of the happiness of the individual, and the success of those who work with other people—salesmen, teachers, and the like—depends in large degree on what habits of social adjustment they have acquired. This analysis can also be made the basis of questionnaires and self-rating charts and should be of service in scientific experimental work in this most difficult field of social conduct.

A LIST OF ACTS WHICH INDICATE THE ABSENCE OF TACT OR SOCIAL ADJUSTMENT

	Freq.	Annoy.	Product
DIRECT OVEREMPHASIS OF SELF			
A. Overemphasis of Self in Manner	3.41	3.31	11.29
1. Egotism and conceit	3.11	3.30	10.26
a. Considering oneself perfect	2.51	3.00	7.53
1′. Assuming that one is always right on all questions	2.82	2.98	8.41
b. Always watching out for self only	2.87	2.94	8.43
1′. Being so absorbed in self as not to be willing to help others	2.66	1.93	7.80
c. Stressing own ability and success	2.77	2.89	8.01
d. Believing oneself superior to others	2.67	2.71	7.24
2. Jealousy	3.00	2.77	8.31
3. Manifestations of an inferiority complex	2.80	2.29	6.42
a. Taking offense easily	2.93	2.59	7.60
1′. Not taking blame or criticism kindly	3.19	2.72	8.69
b. Making excuses when defeated	3.48	2.67	9.30
B. Overemphasis of Self in Act	3.36	2.44	8.20
1. Display	3.09	2.18	6.74
a. Dressing conspicuously	3.16	2.67	8.44
1′. Unharmonious colors	2.78	2.64	7.34
2′. Extreme styles	2.98	2.35	7.00
3′. Inappropriate or extreme jewelry	2.95	2.49	7.35
b. Using excessive cosmetics	3.22	2.72	8.76
2. Selfishness	2.92	2.87	8.38
a. "Hogging" anything before the other person	2.48	3.02	7.49
b. Insisting on having own way	3.00	3.13	9.40
3. Trying to get "ahead" of other persons	2.96	2.73	8.09
C. Overemphasis of Self in Speech	3.35	2.50	8.38
1. Talking or boasting about self	3.00	2.72	8.16
a. Continually talking in the first person	3.12	2.56	8.00
1′. "I told you so"	2.72	2.78	7.57
2. Talking or boasting about one's own ability or achievements	2.74	2.78	7.62
3. Talking about ills and misfortunes of self or of family	2.91	2.53	7.37
DOMINATING ANOTHER PERSON OR GROUP			
A. Demanding unreasonable or disagreeable things of the other person	2.10	2.98	6.26

	Freq.	Annoy.	Product
1. Forcing a person to listen to you against his will	2.36	3.22	7.60
2. Asking friends to contribute money in situations in which they do not feel free to refuse	2.38	3.22	7.67
3. Requiring or persuading a person to do something when he is planning or wishes to do something else	2.50	2.85	7.13
a. Insisting on his eating more than he wants	2.24	3.33	7.46
4. Assigning work so heavy that no time is left for outside interests	2.44	3.51	8.57
B. Sponging on other people	2.49	3.74	9.33
1. Permitting and expecting gratuitous services by relatives and friends	2.19	3.38	7.41
C. Causing another's plans to fail	3.23	3.49	11.27
D. Offering unsolicited advice, instructions, directions or assistance	2.42	2.92	7.07
1. Back seat driving in an automobile	2.47	3.22	7.96
E. Scolding	2.26	3.30	7.46
F. Nagging	2.38	4.00	9.53
G. Taking advantage—			
1. As pupil—taking advantage of new teacher	2.35	3.32	7.81
ANNOYING, DISTURBING, OR IRRITATING OTHERS BY OVERACTION OF SELF			
A. Talking	3.24	2.97	9.63
1. Talking loudly to a person in a public place, causing annoyance or embarrassment	2.51	3.33	8.36
2. Using an effected tone	2.24	3.70	8.30
3. Profanity	2.22	3.65	8.11
a. Cursing	2.18	3.48	7.59
4. Obscenity	1.88	3.90	7.34
5. Slang	3.44	2.05	7.06
B. Mannerisms	2.90	2.34	6.00
1. Gushing	2.35	3.17	7.46
2. Rudeness	2.46	3.30	8.12
3. Irritability	2.51	2.98	7.48
4. Bad table manners	2.38	3.31	7.88
C. Irritating or Antagonizing Others	2.46	2.87	7.06
1. Intolerance	2.63	3.03	7.98
a. Religion	2.74	2.62	7.18
2. Not minding one's own business—"Snooping"	2.33	3.64	8.49
a. Prying into the personal affairs of others	2.05	3.62	7.42
1'. Asking another person questions (pumping) to find out what he has been told by others	2.09	3.48	7.28
2'. Insisting upon knowing where a person has been, whom he went with, etc	2.28	3.17	7.24
D. Monopolizing another's time or materials	3.07	2.82	8.66
1. Talking too much	3.18	2.67	8.50
a. Monopolizing the topic of conversation	2.98	2.67	7.96
b. Over the telephone	2.35	2.40	5.64
1'. When you keep a friend or guest waiting	2.33	3.02	7.04
2. With worthless talk	2.40	2.86	6.86
a. Foolish questions	2.51	2.82	7.08
3. Interrupting	3.06	2.97	9.10
a. Manner	2.91	2.81	8.19
1'. Talking	2.92	2.56	7.48
a'. Speaking out of turn	2.75	2.67	7.34
b'. Breaking in when someone is talking to take a story out of his mouth	2.48	2.89	7.17

	Freq.	Annoy.	Product
b. Occasion—when	2.70	2.31	6.24
1'. Thinking	2.67	2.65	7.08
2'. Reading	2.83	2.67	7.56
3'. Studying	2.72	3.02	8.25
4. Monopolizing what is wanted or needed by others	2.52	3.00	7.56
a. Newspapers or books in library or at home	2.38	2.98	7.10
5. Making engagements that inconvenience others	2.20	3.45	7.60
F. Disturbing others	3.00	3.09	9.27
1. Being noisy	2.95	2.83	8.35
a. Talking, singing or playing musical instruments while someone is trying to sleep	2.48	3.17	7.87
b. Making so much noise that one cannot hear over the telephone	2.53	3.07	7.77
c. Talking while someone is listening to the radio	2.67	2.69	7.18
2. At the theatre, concert, lecture, sermon, or entertainment	2.60	3.12	8.11
a. Chewing gum in public places	3.00	2.78	8.35
b. Coming in during act or number	2.62	2.77	7.26
c. Leaving while program is going on	2.57	2.90	7.46
d. Coughing, snickering, whistling, whispering, giggling, or talking, etc., during performance	2.66	3.35	8.92
e. Applying make-up in public	3.13	2.43	7.61
3. Being untidy	2.54	3.00	7.62
4. Committing a nuisance	1.64	3.22	5.28
a. Not disposing of garbage or rubbish properly	2.07	3.50	7.25
b. Throwing paper or other litter in public places	2.38	3.56	8.48
c. Spitting on the sidewalk or in cars	2.19	3.67	8.05
UNETHICAL PRACTICES			
A. Stealing, Deceiving and Cheating	1.87	4.00	7.49
1. Stealing	1.79	4.21	7.54
a. Time	2.44	3.50	8.55
b. Ideas	2.26	3.79	8.58
2. Deceiving	2.40	3.82	9.18
a. Making believe	2.27	3.11	7.07
b. Misrepresenting facts to person who is in need of the truth	1.83	3.91	7.16
c. Lying	2.05	3.56	7.30
d. Giving untrue excuses	2.26	3.13	7.08
e. Claiming credit for work one did not do	2.12	3.52	7.47
f. Omitting the truth when it should be told	2.33	3.37	7.86
g. Exaggerating	2.93	2.87	8.41
h. Bluffing	2.85	3.17	9.04
3. Cheating	2.12	3.79	8.04
a. Copying another's work	2.50	3.74	9.36
B. Unethical business dealings	2.00	3.44	6.88
1. As seller	1.90	2.59	4.92
a. False representation of goods	2.12	3.72	7.90
2. As employee	1.73	3.00	5.19
a. Time wasting	2.20	3.45	7.60
1'. Using employer's time for own work	2.09	3.35	7.01
b. Performing one's work in a slovenly or careless fashion	2.33	3.44	8.02
OVEREMPHASIS OF OTHER PERSONS			
A. Flattery	2.75	3.31	9.11

	Freq.	Annoy.	Product
DEPRECIATING SELF			
A. Complaining or pessimism	2.60	3.10	8.06
1. Blaming circumstances or friends for failures	2.32	3.30	7.66
2. Being a "hard luck howler"	2.24	3.22	7.22
3. Complaining of poverty "Can't afford it"	2.63	2.76	7.26
B. Making Excuses	3.28	2.81	9.22
C. Pumping others for praise	2.24	3.20	7.17
DISPARAGEMENT OF OTHER PERSONS			
A. Sarcasm	2.66	3.41	9.08
1. Answering a question sarcastically	2.48	3.41	8.46
B. Ridicule	2.31	3.32	7.67
C. Criticism	2.76	3.07	8.48
1. Behind another's back	2.73	3.41	9.31
2. In the presence of others	2.27	3.31	7.52
3. Placing blame entirely on the other fellow—"See what you've done"	2.11	3.48	7.35
D. Humiliating a person—injuring his pride—insulting him	1.78	4.31	7.68
E. Gossip (Malicious)—Slander	2.13	4.16	8.86
1. Making "snap" judgments about people and communicating these to acquaintances	1.96	3.65	7.16
2. Attacking a reputation—brand a person with a name	1.77	4.16	7.37
3. Misquoting another person	2.05	3.76	7.72
4. Telling only one side or part of the entire situation	2.46	3.25	8.00
5. Telling unpleasant truths about another when it is not necessary to do so	2.18	3.70	8.08
F. Believing without question unfavorable things about the other	2.15	3.63	7.81
1. Forming "snap" judgments about the other person	2.37	3.16	7.50
2. Failing to give the benefit of the doubt	2.19	3.29	7.21
3. Doubting another's word	2.04	3.67	7.50
4. Doubting another's sincerity	2.00	3.76	7.52
G. Encouraging others in their unfavorable opinion of a person	2.00	3.70	7.40
H. Showing scorn by turning head, gesture of hand or body, or facial expression	2.39	3.38	8.09
1. Laughing or sneering	2.45	3.50	8.59
I. Race Prejudice	2.58	3.20	8.26
1. Calling foreigners disparaging terms	2.11	3.37	7.12
2. Assuming that foreigners are inferior and backward	2.26	3.42	7.74
UNFRIENDLY ACTS			
A. Disloyalty to friends	1.86	4.13	7.69
1. Using friendship for personal gain	2.02	4.04	8.16
2. Taking advantage of a confidence	1.58	4.14	6.54
a. Telling a secret	1.70	4.41	7.50
3. Tale-bearing	1.89	3.88	7.34
B. Improper treatment of another's property	2.28	3.85	8.79
1. Borrowing	2.08	3.35	6.98
a. Tardiness to return	2.62	3.37	8.84
2. Leaving things in disorder	2.26	3.50	7.92
ACTUAL OR POTENTIAL HARM TO OTHERS			
A. Jostling	2.76	3.15	8.70
1. Crowding or pushing	2.93	3.10	9.10
a. In subway	2.98	2.91	8.67
b. On the street	2.47	2.98	7.36

	Freq.	Annoy.	Product
2. Brushing people aside	2.27	3.18	7.23
a. Scrambling for a seat	2.62	3.05	8.00
B. Spreading disease	1.68	3.90	6.56
1. Coughing or sneezing in the air	2.40	3.63	8.71
2. Going out among other people when you are coming down with a cold	2.67	3.00	8.01
C. Being in the way	2.41	3.00	7.24
1. Standing on a crowded sidewalk or in a doorway to talk	2.40	2.98	7.16
2. Refusing to move forward in a crowded car	2.38	3.25	7.74
D. Violating traffic rules	2.50	3.15	7.78
1. Automobile	2.39	2.90	6.94
a. Driving speedily across a main thoroughfare	2.61	3.11	8.11
b. Failing to give signals of intention to turn or stop	2.33	3.46	8.07
c. Passing another car and crowding	2.37	3.63	8.61
d. "Hogging" the road	2.32	3.54	8.22
e. Stopping suddenly without signaling	2.32	3.37	7.82
2. Walking	2.35	2.60	6.12
a. Walking on wrong side of walk causing people to dodge you continually	2.56	2.85	7.30
b. Crossing a street when signal indicates to stop	2.67	2.76	7.35
c. Crossing street at other than intersections—"jaywalking"	3.02	2.75	8.30
d. Walking two or more abreast on the sidewalk and not turning out for people	2.68	2.85	7.65
INDIFFERENCE OR NEGLECT OF SELF			
A. Failing to keep oneself personally at best	2.76	3.47	9.58
1. Failing to keep in good health	2.20	3.28	7.23
2. Failing to keep person and clothing neat and clean	2.41	3.71	8.95
3. Failing to keep alive mentally and spiritually	2.41	3.39	8.18
a. Failing to keep informed on current events	2.85	2.89	8.24
b. Failing to keep informed on current social problems	2.82	2.85	8.04
4. Keeping a narrow, selfish outlook on life	2.43	3.61	8.77
5. Displaying a closed mind to new ideas	2.59	3.65	9.46
6. Appearance	2.40	3.38	8.12
a. Being untidy	2.36	3.56	8.40
1'. Wearing soiled clothes	2.22	3.40	7.56
b. Inappropriate dressing	2.67	3.22	8.60
c. Being dowdy	2.46	3.41	8.40
1'. Shoes run down at heel	2.37	2.98	7.07
d. Being unshaved	2.29	3.13	7.18
e. Suit unpressed	2.60	2.98	7.76
7. Lack of ambition	2.54	3.53	8.98
a. Failing to try to advance professionally	2.24	3.24	7.26
8. Body odor	2.29	3.69	8.46
9. Bad breadth (halitosis)	2.37	3.63	8.61
10. Allowing oneself to become too fat	2.49	2.91	7.25
ANNOYING, DISTURBING, OR IRRITATING OTHERS BY UNDERACTION OF SELF			
A. Lacking a sense of humor	2.33	3.08	7.18
B. Lacking coöperation	2.46	2.84	7.00
1. Failing to live up to rules	2.48	3.10	7.70
2. Not doing one's share of the work	2.15	3.39	7.30
3. Waiting to be told what to do next	2.17	3.31	7.19

	Freq.	Annoy.	Product
4. Failing to coöperate in class as pupil	2.46	3.20	7.88
C. Failing to prepare for classes as pupil	2.50	3.74	9.36
D. Failing to keep promises, engagements, or perform expected tasks	2.33	3.77	8.79
1. Not being punctual. Being late for	2.77	3.31	9.18
a. Engagements	1.97	3.71	7.32
b. School	2.37	3.04	7.21
1'. Not having work in on time	2.60	3.04	7.91
2. Failing to keep promises	1.96	3.62	7.09
INDIFFERENCE OR NEGLECT OF OTHER PERSONS OR GROUPS			
A. Mannerisms of coldness and indifference	2.45	3.10	7.60
1. Snubbing,—"cutting"	2.13	3.40	7.25
2. Putting on superior airs	2.17	3.23	7.02
3. Failing to be interested in other's affairs—interested only in self	2.37	3.18	7.54
B. Ignoring other persons	2.50	3.13	7.83
C. Lack of courtesy	2.88	3.40	9.80
1. Failing to observe the niceties of professional etiquette	2.22	3.20	7.11
2. Lacking consideration of rights of others	2.59	3.25	8.43
3. Inattention when one is talking	2.87	3.05	8.76
4. Inattention when one is performing	2.53	3.65	9.25
a. Singing	2.24	3.19	7.15
b. Playing a musical instrument	2.35	3.12	7.34
5. Showing lack of respect for	1.74	4.02	7.00
a. Age			
b. Physical handicap			
D. Overlooking favorable things about the other person	2.26	3.15	7.12
E. Failing to help a friend	1.78	4.13	7.36
F. Failing to show appreciation	2.58	3.47	8.96
1. Not acknowledging courtesies	2.25	3.22	7.25
G. Failing to meet family obligations	1.94	3.77	7.32
1. Failing to set a good example			
H. Failing to meet civic or social obligations	1.86	3.36	6.18
1. As a public official	1.70	3.05	5.19
a. Failing to correct evils	2.22	3.33	7.40
I. Failing to assume responsibility	2.50	3.30	8.25
1. When distasteful	2.22	3.22	7.16
2. Passing work or responsibility on to others	2.29	3.34	7.66
J. Disregarding other people's rights	2.20	3.46	7.62
K. Failing to try to understand another's point of view	2.39	3.04	7.27
L. Failing to assume blame	2.28	3.40	7.76
M. Talking so that others do not understand	2.03	2.80	5.68
1. Talking on a subject that others in a group do not understand	2.28	2.85	7.27
N. Disregarding another's comfort or health	2.62	3.13	8.20
PERMITTING OTHERS TO DO ANNOYING OR HARMFUL THINGS			
A. Permitting one's children to—			
1. Mark on property	2.00	3.54	7.08
2. Go to school when they are ill	2.07	3.49	7.23
B. Permitting one's pets or animals to run over another's property	2.40	3.30	7.92
1. Harming lawn or flower garden	1.85	3.80	7.04

MISCELLANEOUS ITEMS HAVING AN ANNOYINGNESS VALUE OF OVER 4.00 BUT NOT INCLUDED IN MAIN LIST BECAUSE OF LOW FREQUENCY	Freq.	Annoy.	Produ
Stealing property	1.07	4.16	4.46
Stealing others' plans	1.47	4.02	5.92
Collecting money for one purpose and using it for another	1.27	4.09	5.20
Cheating in a game	1.51	4.16	6.38
Claiming payment on a bill already paid	1.14	4.00	4.56
Giving unsound advice intentionally as to investments	1.35	4.11	4.55
Telling untruths about another	1.36	4.15	5.65
Misquoting another person for dramatic effect	1.49	4.16	6.20
Taking advantage of a confidence	1.58	4.14	6.54
Publicly revealing faults told in confidence	1.27	4.40	5.59
Allowing a friend to pledge himself for us in an obligation which we have no intention of meeting	1.20	4.08	4.90
Refusing to summon medical assistance for guests when they are in need of it	.98	4.00	3.92
Initiating a law suit for a slight reason or for no reason	1.13	4.02	4.54
Blackmailing another person	1.04	4.40	4.58
Losing borrowed property	1.30	4.04	5.26
Doing a mean trick that actually involves a property loss	1.18	4.11	4.85
Physical injuries, intimacies, or hindrance	1.46	4.25	6.21
Cruelty to animals	1.38	4.27	5.90
Persuading another person to do harm	1.20	4.43	5.32
Kissing someone when you are diseased	1.44	4.16	6.00
Failing to help a friend when one sees danger coming to him	1.33	4.16	5.54
Leaving another person in an emergency	1.30	4.22	5.49
Failing to help a friend when he is being maligned by others	1.43	4.18	5.98
"Hit and run" in automobile driving	1.52	4.17	6.34
Failing to assume blame when innocent person is accused	1.51	4.18	6.32

CAN PUPILS MARK THEIR OWN PAPERS ACCURATELY?

T. V. GOODRICH
Public Schools, Lincoln, Nebraska

THE recent introduction into the schools of considerable instructional material of the "work book" type, calling for the marking of the exercises by pupils and the making of progress charts based on these markings, emphasizes the need for some inquiry regarding the accuracy of pupil marking. A progress chart based on frequent, accurate measures of achievement not only yields information of great value but provides without doubt a powerful incentive for hard work. But such a chart based on inaccurate marking will be worthless in the information it yields and may become an incentive to dishonesty. To what extent may pupil marking be depended on, and to what extent is the teacher justified in turning over such work to the pupils?

The experiment reported in this article was carried on in Lincoln, Nebraska, in 20 sixth-grade classes during a period of six weeks beginning April 9, 1928. Its object was: (1) to get definite information on how accurately sixth-grade pupils mark spelling papers; and (2) to develop a method, if possible, that will increase the accuracy of pupil marking. While data were collected only in the field of sixth-grade spelling, the implications extend to other fields, and the conclusions contribute something toward an answer to the general question raised in the first paragraph.

THE WORD LISTS

In this experiment all pupils were provided as needed with 30 word lists of 20 words each, a list for each day of the six weeks period. These words were selected from the Ayres Spelling Scale, five or six words in each list being regarded as difficult enough to be considered "new work." The remaining words presumably had been studied before, and were presented as review words. The words were spelled on prepared blanks drawn to secure uniformity of procedure. (See Chart I).

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Classes were divided into three groups, a control group of three classes which followed the same procedure throughout the experiment, and two experimental groups of eight and nine classes respectively which followed a different procedure each week. In the control group

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Lesson..... Form C

Name .....

Grade..... Date.....

DIRECTIONS FOR CORRECTING

After each misspelled word place a cross (x) in Column A, B, or C as directed by the teacher.

	A	B	C
1			
2			
3			
18			
19			
20			
Total words misspelled			
Total words correctly spelled			

Col. C marked by

Col. B marked by

CHART I. FORM USED FOR "INDEPENDENT CHECK"

The first pupil marks the paper in column C. The paper is then folded on the line between C and B concealing the marks in C. The second pupil then marks it in column B. The owner again marks it in column A with the marks in B and C before him.

there was always a random exchange of papers for the first marking followed by any check the owner wished to make. In the two experimental groups (I and II) a different procedure was followed each week. These procedures were:

First week—Each pupil marked his own paper.

Second week—Papers were exchanged at random and marked. Each pupil then re-marked his own paper with the first marking before him.

Third week—Papers were exchanged at random and marked in the margin of the paper. These markings were then folded under so that they were out of sight and the papers again exchanged for an independent marking. The final step was a third marking of each paper by the owner who had two independent markings to guide him.

Fourth week—The procedure was the same as during the third week, except that the exchange was controlled by the teacher in such

a way as to have each paper marked at least once by a pupil believed to be accurate and reliable.

Fifth week—A chart for displaying the marking record of each pupil from day to day was used. Otherwise the procedure was the same as for the third week. The purpose of the chart was to add an incentive for accurate marking.

Sixth week—The controlled exchange feature was added to the fifth week's procedure.

Both experimental groups followed the procedures listed above. The only difference was that the pupils in Group I made their corrections from the mimeographed word lists, while in Group II (except for the owner's re-check) corrections were made from dictation by the teacher.

TABULATIONS—MEASURES OF ACCURACY

After the pupil markings were finished the teacher examined the papers, checked all incorrect markings with a red pencil, entered the correct score, and sent the papers to the Research Office. The papers were again checked and tabulated by Miss Lucy Bayles, a teacher of one of the experimental classes, who used the data for her master's thesis in the University of Nebraska Teachers College. Each week's tabulation for the various classes and groups showed the number and percent of words correctly marked, the number and percent of lists with no errors in marking, and the number and percent of pupils who made no errors in marking for the week. These percentages were the measures of accuracy by which results were judged. Separate records were kept of each pupil's marking of his own paper and his marking of other pupils' papers. As the pupil's mark on his own paper was always the final pupil mark in the series, the tables and statements of results which follow refer only to these final marks.

The accuracy percentages of the middle class in any group were taken as the measures of central tendency for the group. Chart II shows the measures of central tendency for the control group and experimental Group II for each week. Continued improvement is shown in the experimental group after the second week. Percentages for the control group show some fluctuation but no upward tendency. During the sixth week the experimental group had roughly only about half as many errors in marking, imperfectly marked lists, and imperfect weekly records as during the first week. Experimental Group I did not do quite as well as Group II. The progress curves of this group (not shown) are very similar to those of Group II but consistently lower.

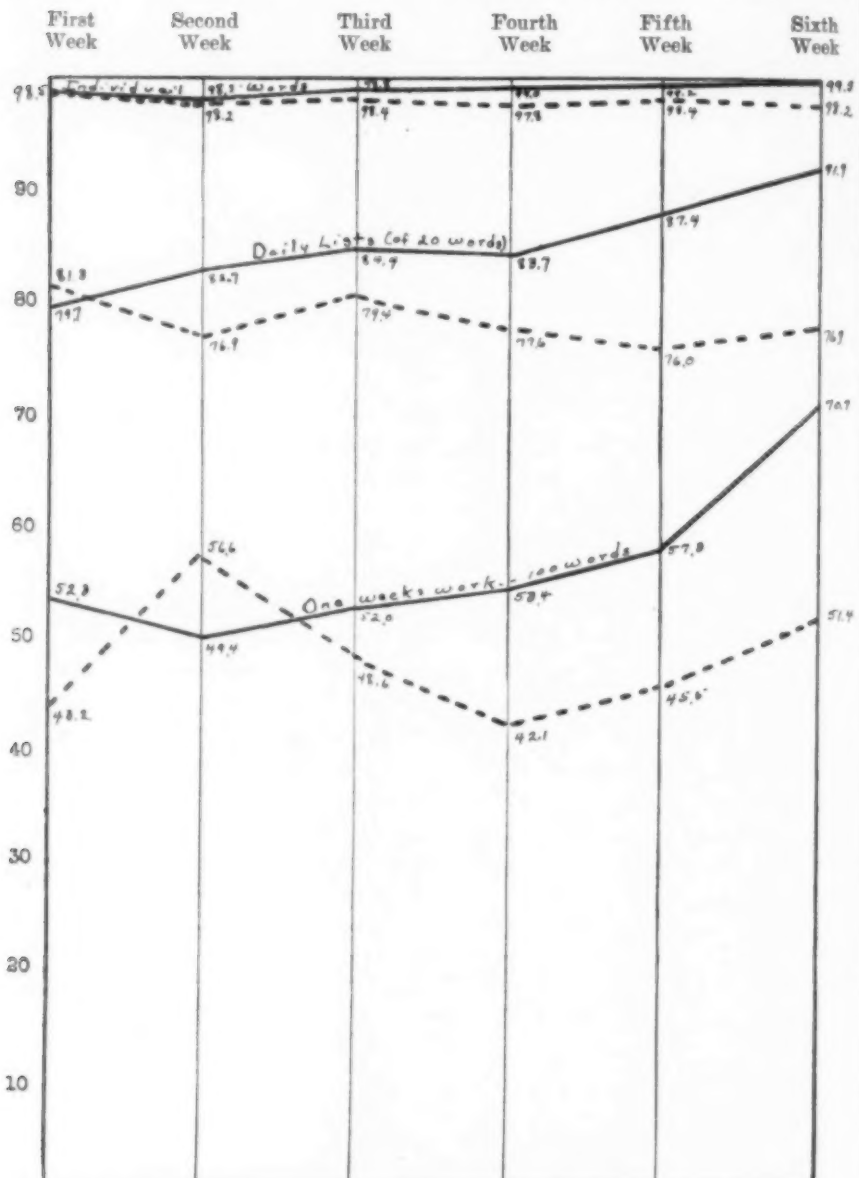

CHART II. PERCENTAGE OF INDIVIDUAL WORDS, DAILY LISTS AND WEEKLY ASSIGNMENTS CORRECTLY MARKED BY THE MIDDLE CLASS

——— middle experimental class — — — — middle control class

Read as follows: In the middle experimental class during the first week, 98.5 percent of the individual words were correctly marked; in 79.7 percent of the lists there were no errors in marking; 52.3 percent of the pupils made no errors in marking during the entire week. See page 256 for procedures used each week.

Various other measures were computed—percentages of accuracy based on the entire number of pupils in the different groups, percentages of classes gaining or losing as compared with the previous week, and the amount of gain or loss each week. While there was some variation in results, depending on which measure was used, the general tendencies were the same. By all of them, the experimental classes showed more improvement than the control classes, and all of the techniques used after the second week were found to be effective.

The following table gives the three accuracy measures for the poorest, the best and the middle class in experimental Group II for the first, fourth and sixth weeks. In addition to showing what kind of marking may be expected with an average class, it indicates what may be expected of a very poor class and a very good class.

ACCURACY OF MARKING IN THE POOREST, BEST AND MIDDLE CLASSES OF EXPERIMENTAL GROUP II

	1st week	4th week	6th week
Poorest Class:			
Percent of words correctly marked	97.15	97.33	(97.98)*
Percent of papers without error	69.88	72.18	(79.32)*
Percent of pupils with perfect record for one week	25.00	33.33	(47.22)*
Middle Class:			
Percent of words correctly marked	98.45	99.03	99.51
Percent of papers without error	79.73	83.71	91.85
Percent of pupils with perfect record for one week	52.32	53.38	70.71
Best Class:			
Percent of words correctly marked	99.59	99.93	100
Percent of papers without error	93.19	98.60	100
Percent of pupils with perfect record for one week	78.37	93.33	100

THE LEVEL OF ACCURACY EXPECTED IN PUPILS MARKS

The typical class during the sixth week marked words with 99.5 percent accuracy. Is this accurate enough to justify the teacher in turning over some part of the marking to the pupils? Two factors should be considered before the answer is given.

First a considerable proportion of the errors in marking are due to faulty penmanship and consequent doubt as to the writer's intention. Of nineteen teachers questioned, seven said "a few," eight said "a good many," three said "more than half" and one said "practically all" of the marking errors were due to the factor of illegible penmanship. Teacher markings would not entirely eliminate this uncertainty. A list of 276 words containing imperfect letter formations were made by cutting words from the original lists written by pupils, and given to teachers for an independent marking. There was disagreement among the teachers in the marking of 19 percent of these words. The conclu-

*The fifth week's record for this class is given as certain conditions arose tending to make the sixth week unreliable.

sion is clear that on account of the factor of illegible penmanship we cannot expect 100 percent reliability in marking either by pupils or teachers. It should be stated that in several classes the observed dependence of spelling marks on good penmanship led to some effective drill for the improvement of letter formations.

A second consideration is that a single, unchecked marking by the average teacher falls considerably short of 100 percent accuracy. The writer has collected some data on this point which is not presented here. The indications from these data are that it is very doubtful whether a single marking by the average teacher yields more than 99.5 percent accuracy.

In view of these considerations, the conclusion is offered without hesitation that 99.5 percent accuracy in pupil marking of spelling papers is sufficiently accurate to justify its use, and that this degree of accuracy can be secured under properly controlled conditions. There is in this conclusion no implication that pupil marking of work books is justified as ordinarily done. The implication is that good class morale, and methods of marking that tend to promote accuracy and adequate control by the teacher are necessary. Investigations are needed to determine what procedures promote accuracy, and what degree of accuracy can be secured in subjects other than spelling and with various types of testing materials. If pupil marking can be made as dependable generally as this study indicates, its value will be great in making more frequent measures of progress possible and in making the use of such powerful incentives as the progress chart safe. Perhaps it may also be made to contribute to the development of such general traits as accuracy and honesty.

GENERAL CONCLUSIONS

The following tentative conclusions are drawn from the data presented here.

1. Under ordinary conditions and methods the average 6th grade class may be expected to mark correctly 98.0 to 98.5 percent of the spelling words found in a daily lesson of 20 words; all of the words will be marked correctly in approximately 80 percent of the cases; and in approximately 50 percent of the cases no errors in marking will be made during the entire week. By the techniques employed in this experiment these percentages may be raised to at least 99.5 percent, 90 percent and 70 percent respectively.

2. The poorest classes may under ordinary conditions be expected to mark 95 percent of the words correctly. Approximately one-half of the lists will be without error and approximately one-fourth of the pupils will mark an entire week's work without error. By the techniques employed in this experiment these figures may be raised to 98 percent, 70 percent, and 50 percent respectively.

3. The best classes may be brought to 100 percent accuracy in marking for as long a period as one week.

4. By using the methods employed in this experiment the average class can eliminate 50 percent of the marking errors made under ordinary conditions.

5. A considerable part of the remaining errors in marking are due to questionable penmanship. The marking of the papers by the teacher would not entirely eliminate this factor.

6. It is doubtful whether a single unchecked marking by the average teacher will yield more accurate results than those attained by the average class in this experiment.

7. There are fewer errors where corrections are made from dictation by the teacher than from mimeographed lists.

8. A single random exchange of papers tends to decrease the accuracy of marking as compared with the pupil's marking of his own paper.

9. The devices used in this experiment, the independent check, the controlled exchange of papers and the recognition given the pupil were all effective in increasing accuracy of marking.

10. The experiment indicates that pupil marking has excellent possibilities. Experiments with other grades, in arithmetic as well as spelling, and with drill materials and objective tests in other subjects would be desirable.

A CRITIQUE OF REMEDIAL AND DRILL MATERIALS IN ARITHMETIC

HARRY A. GREENE
University of Iowa

1. TYPES OF ARITHMETIC DRILLS

EXPERIENCE with the problems of teaching and supervising arithmetic reveals the fact that there are at least three distinct types of drill materials in arithmetic which must be utilized if instruction in this field is to be maintained at an effective level. In the first place, *initial instruction* must be accompanied by adequate opportunity for repeated experience with these new facts if they are to be fixed more or less permanently in the mind of the student. Accordingly, drill material to perform this function must be so designed that it places additional emphasis on the more difficult items to be mastered. In the second place, drill must be provided for *maintenance* purposes. This type of drill is ordinarily characterized by its tendency to sample the several fields which are being emphasized and to provide devices for the more thorough coördination of these skills. The third type of drill is of a *remedial* nature. Remedial drills are so designed that they furnish the student a complete sampling of each of the basic skills that are presented for initial learning and that finally make for arithmetical accomplishment.

These three types of arithmetical drill may be illustrated by some actual examples. The first set of material represents drill exercises designed to perfect the initial mastery of an easier group of addition facts. It will be noted that this exercise, which is called a "learning lesson," presents each of the five basic facts once, together with the correct initial response. Since these five facts are approximately equal in learning difficulty the supplementary drill on each of these basic combinations is the same. As progress is made in the mastery of these combinations and the more difficult ones are encountered, each more difficult combination is given additional opportunities for initial drill. In this way the greater learning difficulty of each harder combination is compensated for.

Drills for maintenance purposes may be illustrated by the accompanying material which is designed to give mixed drill on facts which have been previously mastered, but which, due to inherent difficulties in learning, require additional emphasis. Attention is called to the fact that while this drill deals only with addition of whole numbers it provides a carefully distributed practice with a number of other difficulties, such as,

DRILL FOR INITIAL LEARNING
LEARNING LESSON; BASIC ADDITION FACTS[1]

STEP 1

	1 1 2	1 2 3	0 0 0	2 2 4	3 3 6
a.	1 2	2 2	1 1	3 3	0 0
b.	1 1	0 0	3 3	1 2	2 2
c.	0 0	3 3	2 2	1 1	1 2
d.	3 3	1 2	0 0	2 2	1 1
e.	2 2	1 1	1 2	0 0	3 3

zero combinations, copying figures in columns, irregular column addition, etc. In this way previously mastered skills are kept alive.

DRILL FOR MAINTENANCE OF SKILLS[2]

Find the sums in the six examples below. Write your figures neatly.

1. 40
85
23
4
—

2. 23
60
33
47
—

3. Copy the examples below in column form, and find the sum.
$47 + 5 + 10 + 13 =$

4. Copy and add:
$2 + 80 + 7 + 87 =$

5. Copy and add:
$10 + 70 + 87 + 18 =$

6. Copy and add:
$50 + 60 + 52 + 3 =$

[1] This material is taken from an unpublished set of instructional drills prepared by the author of this report. These five basic addition facts are the easiest of the 100 basic addition combinations as determined by a composite of the Clapp study and the Knight-Behrens study. Each group of five basic facts is presented for initial learning and drill in this manner, the more difficult combinations receiving additional practice in proportion to their difficulty.

[2] Taken from Review Unit Three, *Arithmetic Work-Book for Grade 3*, by Knight, Ruch, and Studebaker. Scott, Foresman and Company, Chicago, 1926.

The following is a distribution of practice as found in this exercise:[3]

	Number added:									
		0	1	2	3	4	5	6	7	8	9
	1		2	1		1				1	
	2		1							1	
	3	1		1		1	1			1	
	4				1						
	5	2		1				1			
Number	6										
	7				1		1		1		
added	8							1	2		
	9									1	
to:	10	1			1				1		
	11					1	1				
	12	1									
	13										
	14	1		2							
	15	2									
	16										
	17		1								

Remedial drill material designed to correct deficiencies in similar fields to those illustrated above is presented in the accompanying illustration. This particular illustration represents material designed for remedial work with the higher decade addition facts.

DRILL FOR REMEDIAL PURPOSES[4]

Write the Sums:				
10 + 5	14 + 6	14 + 8	15 + 9	18 + 9
11 + 7	11 + 9	15 + 6	19 + 6	20 + 7
12 + 9	12 + 5	17 + 7	18 + 5	21 + 8
13 + 8	10 + 6	19 + 5	16 + 7	22 + 6
14 + 5	13 + 6	18 + 6	17 + 9	19 + 8
10 + 7	14 + 9	16 + 8	18 + 7	23 + 8
12 + 6	11 + 6	17 + 5	16 + 5	24 + 5
11 + 5	13 + 7	18 + 8	17 + 8	20 + 9
14 + 7	10 + 8	15 + 5	16 + 9	22 + 8
13 + 5	13 + 9	16 + 6	15 + 7	21 + 5
10 + 9	11 + 8	15 + 8	17 + 6	23 + 5
12 + 8	12 + 7	19 + 7	19 + 9	20 + 5

The foregoing illustrations of the three major types of drill in arithmetic are presented for the purpose of definitely pointing out the differences between remedial drill material and effective instructional material. It is evident from these illustrations that there are many similarities between instructional and remedial material. As a matter of fact it is probable that good remedial drill material represents fundamentally sound initial instructional material. The major difference lies not so

[3] This distribution shows that 1 was added to 1 twice, zero was added to 5 twice, etc.

[4] These remedial drills on higher decade addition facts are taken from Remedial Card Number 3 of the *Economy Remedial Exercise Cards, Whole Numbers*, published by Scott, Foresman and Company, Chicago, 1927. The exercises shown are sixty of the 150 appearing on this card. There are three such exercise cards providing remedial practice on 450 of the most frequently used higher decade facts.

much in the material as in the *time* it is used. There are some minor differences, however, which it may be well to point out. Remedial drill material must present at least *once* all of the basic facts and skills which contribute to the total mastery of the processes under consideration. For example, a remedial drill lesson about the 100 basic facts in addition must present each of these facts at least once. Instructional material must also ultimately present each fact, but adequate instructional material will furnish supplementary opportunity for experience with each of the more difficult facts.

2. PROPOSED CRITERIA FOR ARITHMETIC DRILLS

It is probable that the major differences between these types of drill materials may be pointed out most definitely by recapitulating here the various criteria for drill materials which have been enunciated by workers in this field. The following specifications for a definite drill program in the four fundamental processes have been stated by Miss Burton reporting in the Fifth Yearbook of the Department of Elementary School Principals:

1. Drill must fit the needs of the class as determined by some type of diagnosis.
2. Drill must make clear to the pupil just what he is doing, why he is doing it, and the best method of doing it.
3. Drill should be on one element at a time.
4. Good drill keeps all pupils busy all of the time during the drill period.
5. Good drill presents the same material in a variety of ways.
6. Drill should demand a maximum of attention. Attentive repetition is necessary.
7. Drill periods should be short and at frequent intervals.
8. Good drill will protect against the formation of bad habits.
9. Good drill lines up with the instinctive tendencies of the pupils—group rivalry, play, etc.
10. Good drill provides for individual work.
11. Drill is more effective under timed conditions.

Concerning the criteria for arithmetic drill Osburn makes the following statement: "If a practice series is to be valid it must conform to the following requirements:

"1. It should cover all of the field which it claims to cover.

"2. It should afford practice which is proportional in amount to the difficulty of the several associations which are to be formed.

"3. It should afford additional practice upon those associations which are of relatively greater social importance."

Knight reporting in the Third Yearbook of the Department of Superintendence sets up the following eight specifications for drills for maintaining acquired skills:

1. Drill should be on the entire process.
2. Drill should come frequently in small amounts.
3. Each drill unit should be a mixed drill.
4. Drills should have time limits.
5. Drills should have accuracy standards.
6. Examples in a unit of drill should be in the order of difficulty.
7. Drill units should include verbal problems.
8. Drills should facilitate diagnosis.

The following criteria for remedial drill materials have been presented by the present writer:

1. Analysis of underlying basic skills must precede diagnosis.
2. Diagnosis must be specific.
3. Each identified skill must be paralleled by valid drill.
4. A complete area of skill must be covered.
5. The underlying skills must be synthesized.
6. Time and achievement standards must be provided.

3. EXPERIMENTAL EVIDENCE ON VALUE OF ARITHMETIC DRILLS

The foregoing section has presented the characteristics of the three major types of drill material in arithmetic along with certain more or less accepted criteria for their construction. It is the purpose of this section to present such experimental evidence on the values of remedial drills as is now available. At the outset it may be well to point out again that practice materials and remedial drills represent two somewhat distinct types of drill technique and should accordingly be considered separately. It should also be pointed out that both practice and remedial materials may exist in two distinct fields of arithmetic, namely, (1) the fundamental processes, and (2) problem solving.

Fundamental Processes.—The relative recency of development of remedial materials as such makes it rather difficult to secure and present extensive evidence on the value of such drills. A number of experiments on the value of general practice materials have been conducted. Practically without exception these experiments have demonstrated the efficiency of practice drills. The amount of improvement is naturally not

uniform from experiment to experiment, nor for all types of material. In one of the earlier experiments designed to evaluate the effect of drill work on the fundamental operations in arithmetic, Brown gave a series of five-minute drills on the fundamental number facts. This was an experimental study conducted in grades 6, 7, and 8, and was checked by controlled classes. The experiment itself involved only 51 pupils and extended over the rather short period of 30 days. According to the evidence presented, the effect of the drill was marked and found positive in the three experimental grades. The value of the drill was found to carry over even after a twelve weeks' vacation period. At a later date this same investigator conducted a similar experiment with 222 sixth-grade children in which a similar type of drill was used. Tests given at the beginning and end of the study clearly indicated a significant improvement.

One of the more important evaluations of commercial drill materials designed chiefly for maintenance purposes is that reported by Mead. This investigation was conducted in the schools of Cincinnati during the year 1914-15. Twelve classes of approximately 450 pupils in each of the two groups were used. The purpose of the study was the comparative evaluation of the *Courtis Practice Tests* and the *Thompson Minimum Essentials in Arithmetic*. The results show that neither type of drill material was entirely effective in bringing about changes in arithmetic efficiency. On the other hand, a considerably larger proportion of the skills involved actually showed gains rather than losses as a result of the experiment. Furthermore, the classes utilizing the *Courtis Practice Tests* in arithmetic made significantly greater gains in general efficiency than those using the Thompson material. The real significance of the gain resulting from the two types of drill material is most definitely shown by the efficiency score, efficiency being defined as the percent of pupils achieving 100 percent accuracy on a certain standard number of examples.

A similar comparative evaluation of three types of drill in arithmetic was reported by Kelly in 1920. In this study the *Courtis Practice Tests in Arithmetic,* the *Studebaker Economy Practice Exercises,* and an informal type of drill material prepared by teachers were used. From 133 to 173 cases were involved in each section of the experiment. The results of this study are summarized in the following table adapted from the report.

Drill Material	Gain in Speed	Gain in Accuracy
Courtis Practice Tests	21%	16%
Studebaker Practice Exer.	12	11
No special material	7	10

Two significant quotations of the conclusions drawn from the study are given herewith: (1) "Both the Courtis material and the Studebaker material secured greater gains than the ordinary school procedures and on the average the Courtis material secured greater gains than the Studebaker." (2) "Both the Courtis and Studebaker material secured better adaptation of drill to individual pupil needs than did the ordinary classroom procedure; and it appears that on the whole the Studebaker material secured a little better adaptation than did the Courtis."

Evans and Knoche experimented with the *Studebaker Economy Practice Exercises in Arithmetic* in the 6A and 6B grades of certain schools in Columbus, Ohio. Forty-three drill periods were utilized. They concluded that "such drills as the one used have a great value in increasing the ability of a class in terms of accuracy far beyond the class exercises and drills now given the public schools for the purpose. This special exercise benefited all members of the class regardless of whether they were slow or fast, dull or bright, very young or very old for the grade."

Two very recent unpublished studies of the value of certain types of drill exercises show quite clearly the significance of a definite program of practice and remedial drill. In the first of these studies, a definite comparison of the *Courtis Practice Tests* and the *Economy Remedial Exercise Cards in Whole Numbers* was made. The experiment was conducted in the fourth grade of one building in the Fort Scott, Kansas, schools. An initial test (The *Compass Survey Test in Arithmetic*[5]) was given in October (Form A) and in March (Form B). The experiment itself was conducted throughout two school years, eighteen weeks elapsing between the initial and final test in each case. The data indicate that the 104 pupils using the *Economy Remedial Exercise Cards*[6] made 54 percent of the total possible gain on these tests while the same number of paired cases using the Courtis Practice Tests made a total of 38 percent of the total possible gain. The two groups of pupils were measured by the *Otis Intelligence Tests* and were found to be of practically equal mental ability, the average and the range being almost identical for both groups.

Although this investigation is limited in the number of cases and in general scope, it indicates that the type of practice material makes considerable difference in the results obtained. It seems quite probable that the extensive analysis of available remedial drill materials made by

[5] Published by Scott, Foresman and Company, Chicago.

[6] *Ibid.*

Coquillette offers the basis for accounting for the differences in efficiency of these two drill materials. This study revealed distinct differences in the distribution of drill provided by these two sets of drill exercises.

Additional significant evidence on the question of the value of properly distributed drill versus undistributed drill is furnished by a study by Luse. In this investigation 576 fifth-grade pupils in five school systems were given 50 drill periods of 15 minutes each. The drill material for one half of the pupils was carefully distributed according to definite specifications while the drills for the other half were haphazard drills. As a result of this study Miss Luse concluded that both groups made decided gains. Furthermore, distributed drill gave an excess of gain over non-distributed drill in terms of examples correctly solved of 17.7 percent in addition, 18.8 percent in subtraction, 35 percent in multiplication, and 23.97 percent in division. The distributed drill appeared more effective in the case of the harder examples, and of greater value in the case of the less able pupils. The superior gain of the group practicing on the distributed drill persisted even after a summer vacation. In the total comparison there were 126 opportunities for either form to yield results higher, lower, or equal to the other drill. Distributed drill exceeded in 120 cases, of which 75 were statistically significant. It therefore seems unsafe to assume a transfer in such a narrow mental function. There must be specific drill on the skills which are to be developed. It is therefore important that drill be constructed in accordance with carefully written specifications.

In an analysis of the drill provisions of the *Courtis Practice Tests* and the *Studebaker Economy Practice Exercises in Arithmetic*, Osburn points out that there are 1470 specific combinations to which the pupil must be able to respond correctly if he is to attain mastery in the fundamentals. These are: "(1) one hundred principal combinations in addition; (2) one hundred principal combinations in subtraction; (3) one hundred principal combinations in multiplication; (4) four hundred and fifty combinations in short division, including the cases where there are remainders; (5) seven hundred and twenty higher decade additions, not including the zeros of the higher decades nor anything above the ninth decade."

The complete distribution and analysis of practice in these two sets of practice material shows that "there are wide variations in emphasis with much practice on the easy combinations and entirely too little practice on many of the harder combinations. Drill on the zero combinations is

sadly neglected. Of the 1470 number facts which are considered to be basic at least 500 do not occur in these practice tests at all. Too little attention is paid to the higher decade addition facts and wholly inadequate practice is provided for the short division facts involving remainders."[7] In spite of these weaknesses brought out by the analysis these two practice exercises have undoubtedly been of tremendous value to teachers of arithmetic.

A study by Logan presents in a slightly different form the results of a comparative evaluation of a specific remedial program. This study was confined to 114 pupils in a single school system and was carried on through grades 4, 5, 6, and 7. The study indicates that by the use of standardized remedial material prepared for correcting specific weaknesses, these weaknesses can be overcome in a relatively short period of time. In a period that is equivalent to one week of ordinary arithmetic instruction allowing a typical period of 25 minutes per day, a gain of approximately one-fourth of a year as measured by the *Compass Survey Tests in Arithmetic* was found. In one specific case the average time of 65 minutes drill on subtraction resulted in a mean gain of over 1.5 grade units of improvement. The evidence from this study substantiates at practically all points the claim that standardized remedial material is exceedingly valuable for use in connection with arithmetic instruction. Time spent in drill on standard remedial exercises results in a distinct increase in the efficiency of work.

The importance of time and achievement standards for remedial drills is clearly demonstrated in a study by Panlasigui. This experimental study is based upon two equated groups of 358 pupils each for whom twenty-one weeks of drill periods were provided. The results clearly show that awareness of success and progress in arithmetic drill is an extremely effective motivation device in itself, particularly among the normal and bright pupils.

A number of other investigations of the use of miscellaneous types of drill materials have been conducted, notably those by Burton, Messick, and Newcomb. Almost without exception these studies have revealed the expected increase in arithmetic efficiency due to the use of drill exercises.

Problem-Solving.—Significant contributions to the field of problem solving have been made by a number of investigators prominent among

[7] A recent revision of the *Studebaker Economy Practice Exercises* in Arithmetic has been made in which this distribution of practice has been significantly improved.

whom are Stevenson, Myers, Davies, Osburn, Lutes, Greene, Crooks, and Thomas. Stevenson, after analysing the errors made by pupils in solving verbal problems concluded that the following six factors account for most of the difficulty: (1) physical defects; (2) lack of mental ability; (3) lack of skills in the fundamentals; (4) inability to read arithmetic problems; (5) lack of general and technical vocabulary; and (6) lack of proper methods or techniques of attacking problems. Later Stevenson developed and standardized a problem analysis test for the purpose of discovering the pupil's ability to read arithmetic problems and to discover his methods of attacking the solution of a problem.

Myers concluded that reasoning ability correlates more highly with intelligence than it does with skill in the fundamentals. He lists six factors involved in problem solving: (1) silent reading ability; (2) familiarity with the vocabulary of arithmetic; (3) experience necessary to understand the problem; (4) knowledge of the fundamentals; (5) dependable habits of computation; and (6) interest in solving problems.

Davies found a low correlation between computation and reasoning ability ($r = .06 \pm .12$). Thomas found that problem solving ability correlates highly with native intelligence. He also concluded that problem solving ability as measured in his study was not significantly improved by general drill on the fundamental processes. Possibly this improvement might have been greater if the drill on the fundamentals had been upon the specific skills called for in the verbal problems rather than being general in character.

Osburn analysed 30,000 errors made by 6000 pupils in the solution of verbal problems. He concluded that total failure to comprehend the problem, the omission of essential elements in the solution of it, and errors in the fundamentals accounted for the major portion of these errors.

Similarly Lutes classified 1025 errors in the solution of problems and found that ignorance of the involved principle or rule resulting in the performance of the wrong operation accounted for 37.6 percent of the errors. Computational errors mainly in the fundamental processes with integers accounted for an additional 45.8 percent.

Of the experimental investigations designed to determine the efficiency of special types of drill and remedial exercises in the improvement of problem solving those by Lutes, Greene, Crooks, and Thomas deserve mention.

Lutes experimented with three techniques for the improvement of problem solving ability in sixth B classes in twelve elementary schools in Des Moines, Iowa. All possible variables were controlled. The remedial drill itself was designed to correct the three major types of error in problem solving which Lutes himself found from an analysis of pupils' errors: (1) ignorance of principle, or wrong operation; (2) comprehension difficulties; and (3) computation errors. At the end of a twelve weeks drill Lutes drew the following conclusions:

"1. All pupils of normal intelligence can profit from instruction in problem solving. Those of higher intelligence profit most, but all within the normal mental age range make gains sufficient to justify spending time on such instruction.

"2. Of the techniques used in this experiment, that which had for its main purpose the emphasis on computational skill produced the greatest gains both in computation and reasoning.

"3. All the groups in this experiment made gains in problem solving as measured by the Stanford Achievement Test, which are statistically significant. This includes the Control Group as well as the three experimental groups.

"4. Motivation is an important factor in securing improvement in problem solving ability. This conclusion is supported by the fact that the Control Group made the second largest gains of the four groups, and that all groups made greater than normal or expected gains.

"5. Improvement in computational accuracy does increase ability to solve verbal problems; whether it increases ability to do arithmetical reasoning cannot be stated from the results of this study. It does improve ability to earn scores on tests of ability to solve verbal problems, which is the school's definition of arithmetical reasoning."

Greene, after analysing problem solving into five fundamental steps closely paralleling Dewey's five formal steps in the thinking process, presents some evidence based upon a controlled experiment that involved 92 pupils, indicating the value of a certain type of drill. The drill in this case consisted in providing much experience in the reading of simple verbal problems and in deciding which process or processes would be used if the problem were to be worked. In general, the study shows that even the very limited amount of time spent in the reading of verbal problems and in the selection of the processes necessary to solve them was more profitable than the same amount of time spent in following the normal classroom procedure in such instruction.

The only experimental study having for its purpose the evaluation of any existing commercial material designed for remedial work in problem solving is the study by Crooks. He used 79 pupils in a control group and 107 in an experimental group. The pupils were distributed through grades five, six, seven, and eight. The remedial material used was the *Economy Problem-Solving Exercises*. Such factors as mental ability were controlled in the selection of the two groups. The drills required 12 minutes per day for the fifth grade, 10 minutes per day for the sixth grade, 8 minutes for the seventh grade, and 7 minutes for the eighth grade. The experimental groups drilled on these exercises daily for six weeks, while at the same time the control groups were taught arithmetic as they had been previously taught without any drills or remedial materials. The results show that even in this extremely short period pupils made some gain in problem solving ability as measured by problem analysis tests.[8] One of the groups, grade eight, made a gain that was found to be statistically significant. It should be pointed out that a few weeks is entirely too short a time in which to expect significant improvement in a field as complex as problem-solving ability—a composite of skills which it takes years to develop.

4. SUMMARY AND CONCLUSIONS

The experimental and documentary evidence which has been summarized in this report serves to make clear certain issues involved in the development and use of arithmetic drills. The data show that the drill must be constructed to fit a particular purpose and type of use. Furthermore, the distribution of practice afforded in the drills must be carefully controlled. Doubtless it is in this specific phase that the more carefully constructed commercial drills are found to be more effective classroom instruments than those prepared by the average classroom teacher. Some evidence is shown that certain types of commercial drills are more effective instruments in the classroom than others. That this may be a function of the distribution of the drill provided is a possibility. It is also likely that much of the difference may be due to the attitude of the teachers using it, as well as to the pupil motivation provided by the drill itself.

Almost without exception, the experimental studies of the drill and remedial material show significant returns for time spent on such drill.

[8] *Compass Diagnostic Tests in Arithmetic*, Tests 17 and 18, 19, and 20, Scott, Foresman and Company, Chicago.

This is true in the fundamental processes as well as in the field of problem-solving. The growing interest of teachers and supervisors in this type of classroom work is being recognized commercially by the rapid appearance of a large number of different types of practice and remedial materials in recent years. If these materials are critically selected in the light of the best evidence, and used with the proper safeguards, they will doubtless result in decidedly increasing the efficiency of arithmetic instruction in the future.

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TEACHER OPINION ON ABILITY GROUPING

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ABILITY grouping has been practiced in the schools of Reading, Massachusetts, for several years, and this form of organization is now used in Grades I to IX. The grouping is done very carefully by the use of group achievement and intelligence examinations supplemented by school marks, teacher judgments, health records, personality characteristics, and other pertinent facts. The present paper reports the results of a questionnaire sent to the teachers of the junior high school and the intermediate school in an attempt to find out in what repute the plan was held by the teachers after a three-year trial. The authors are well aware of the difficulties and dangers involved in the use of the questionnaire, and realize the necessity of suspending judgment as to the general value of ability grouping until objective experimental evidence can be obtained regarding its advantages and disadvantages. The opinion of interested and competent observers, however, is valuable and important, so the making and reporting of this study seems justified.

The questionnaire was designed to gather information on several points. It was desired to discover how well the plan was realizing the general objectives for which it was set up, and also to get some light on the validity of some of the commonly mentioned objections to grouping. Incidentally, the opportunity was taken to discover how many pupils were, in the judgment of the teachers, misplaced in their groups, (Question 1.), and to find out what was being done to foster social development (Question 10.), and leadership (Question 11.).

The questionnaire is reproduced below. The teachers were urged to state their opinions frankly, and to describe conditions as they actually existed and not as they were theoretically supposed to exist.

QUESTIONNAIRE ON ABILITY GROUPING

Our homogeneous grouping is not intended to be fixed, but a constantly changing, flexible arrangement. We are dealing with growing children. Growth and change are synonymous. In the light of this understanding are you making frequent suggestions for changes in grouping to your Principal or Guidance teacher?

1. What changes in placement of individual pupils do you suggest at this time? Give reasons.
2. In your opinion do the children actually learn more under this system of grouping than before it was practiced? How do you know?
3. Do you find it easier to teach homogeneous groups than heterogeneous classes? In other words, as a method of individualizing instruction is grouping helpful to the teacher?
4. Do you have fewer disciplinary problems? More? About the same?
5. Are the bright children becoming egotistical or developing any unsocial trends?
6. Are the dull pupils contented in their assigned places, or do they express dissatisfaction and give evidence of any inferiority feeling?
7. Does grouping tend to brand or stigmatize the pupil?
8. Is it tending to limit the possibilities of development of the individual child? This is known as "Determinism" in Education, not in keeping with the ideals of a democratic American school. The Miller plan of instruction is supposed to counteract this danger.
9. Do the pupils in Group F or E have the same opportunity to do an "A" assignment as Group A pupils? Do you encourage them to do so?
10. The school is supposed to be a socializing institution in which children learn to live together efficiently and harmoniously. It should offer opportunities for socialized recitation and group work on the principle that *those who have* (in this case meaning mental ability) *must share with those who have not.*
    What socializing activities do you carry on?
11. What opportunities for developing and recognizing leadership, intellectual or otherwise, does the school offer under the present system? In the classroom? In school activities?
12. Does grouping cause the bright child to put forth less effort?
13. By losing his contacts with the activities and recitations of the brightest pupils has the dull child lost more than he has gained through segregation?

The general results of the questionnaire are shown in the following tables. The answers are listed as favorable or unfavorable to ability grouping.

The outstanding fact shown by these tables is the high frequency of replies which are favorable to ability grouping. In the junior high-school group the ratio of favorable to unfavorable replies is over 4 to 1, and in the intermediate school it is nearly 3 to 1. This would seem to indicate that the objectives are being realized, and that the dangers are not as great as have been supposed by some of the critics.

Another point worthy of note is that some teachers are still undecided

TABLE I

ANSWERS TO THE QUESTIONNAIRE FROM TWENTY JUNIOR HIGH-SCHOOL TEACHERS

Question	Favorable	Unfavorable	Undecided	Unanswered
2	14	1	2	3
3	13	4	0	3
4	11	0	4	5
5	11	5	4	0
6	13	7	0	0
7	12	7	1	0
8	15	1	0	4
9	17	1	0	2
12	14	3	1	2
13	14	4	2	0
Totals	134	33	14	19
Percent	67.0	16.5	7.0	8.5

TABLE II

ANSWERS TO THE QUESTIONNAIRE FROM NINE TEACHERS IN THE INTERMEDIATE SCHOOL

Question	Favorable	Unfavorable	Undecided	Unanswered
2	6	1	1	1
3	7	0	0	2
4	7	1	0	1
5	1	6	1	1
6	5	3	0	1
7	6	1	1	1
8	5	0	1	3
9	Applied only to Junior High School			
12	5	2	0	2
13	5	2	0	2
Total	47	16	4	14
Percent	58.0	19.8	5.0	17.3

and unable to give definite answers to the questions on ability grouping. This is probably a healthy sign, indicating that the teachers did not feel forced to give favorable answers first because the plan was well thought of by their superiors. A few of the teachers were unable to answer some of the questions because of a lack of previous teaching experience.

A number of points appear to merit discussion in more detail. On question 5, *Are the bright children becoming egotistical or developing any unsocial trends?*, there was found real disagreement. In the intermediate school only one teacher out of nine had not noticed this tendency, while six were sure that unsocial trends were operating. In the junior high school the weight of opinion was reversed. Eleven replies were

favorable, but five teachers noticed anti-social trends, and four were undecided.

Closely connected with question 5 is question 6, *Are the dull pupils contented with their assigned places, or do they express dissatisfaction and give evidences of any inferiority feeling?* The balance of replies here is on the favorable side, eighteen to ten, but this balance is much less favorable than that for other questions. Evidently their problems on this question have not been entirely solved.

It should be noted that the teachers are always warned to watch carefully for and guard against any superiority or inferiority feelings that a child may have in regard to his group status. It is not considered an honor to be in a high group nor a disgrace to be in a low one, and the children should not be made to feel that there are any distinctions between the groups.

Question 7 asked, *Does grouping tend to brand or stigmatize the pupil?* Here again the answers, in general, were favorable, with, however, a rather high unfavorable tendency. Some of the individual answers to this question are interesting and enlightening. "Much less than being the class dunce." "Not so much as being the class dummy, for there is always something that the inferior pupils can do better than any other group, and under this plan they have the opportunity to do it." "It would if emphasis were placed on the grouping, but it is not." "When the plan started, it did . . . . now there is less of it." "Not if properly administered."

These replies make it clear that if a pupil feels stigmatized by ability grouping it is likely to be the result of poor administration and faulty attitudes and actions on the part of the teachers. It is, also, pertinent to note that when a pupil asks for a transfer to another section it is usually to be with some friend or group of friends, and not because of wounded intellectual pride.

A very important possibility and a basis of much criticism is touched upon by question 13, *By losing his contacts with the activities and recitations of the brightest pupils has the dull child lost more than he has gained through segregation?* The weight of teacher opinion is that the dull child gains much more than he loses, because in the selected group he receives treatment suited to his capacity, and his contacts with brighter children are more than made up for by the extra attention and help which he receives from his teacher. As one reply very aptly stated, "Decidedly, No! For the first time he has a chance for mastery of a subject, uninter-

rupted by quicker minds, and undistracted by minds of richer and more varied interests."

Perhaps the most important subject of all is touched upon in question 8 which deals with the possibilities of limiting the development of the child, or so-called Educational Determinism. Although some teachers were undecided on this point, only one out of twenty-nine believed that the individual development was interfered with. On the contrary, there was a general belief that grouping combined with individual instruction enlarges the possibilities of individual development. Of course, it was in the belief that this would be true that the Reading plan was inaugurated.

Questions 10 and 11 dealing with the socializing activities of the groups and the opportunities for developing leadership brought forth many interesting descriptions of classroom procedures, club work, and other activities. Judging from the replies, about half the class time is spent in socialized recitations, especially in the social studies. One teacher remarked, "Even with the individual work, there is a social atmosphere. If a child is far ahead, he is allowed to help a slow one if he wishes. It is optional with him, but I find that he is always glad to do it."

There are many opportunities for the development of leadership in connection with the traffic squad, leader's clubs, home-room organizations, subject clubs, debating teams, the school paper, the cafeteria, and similar things. The activities are carried on in both the homogeneous classes and the mixed home-room groups.

Altogether, the answers to these two questions show unmistakably that the teachers clearly understand the importance of social activities and the development of leadership. They are not neglecting these things in the mistaken belief that ability grouping and individualized instruction will solve all educational problems, but, on the contrary, are doing all they can to foster the social growth of their pupils.

The findings of this study may be summarized as follows:

1. The teachers were of the opinion that children actually learn more under the Reading system of Ability Grouping than they did before it was practised.
2. Teachers found it easier to teach homogeneous groups.
3. Fewer disciplinary problems appeared after ability grouping was introduced.
4. The teachers were about evenly divided on the question as to whether grouping tends to make the bright child egotistical and anti-

social. In the intermediate school there was a decided belief that bad results do follow grouping, but in the junior high school the weight of opinion was very much the other way. This may mean that as children grow older, or as they have more experience in ability groups, the tendency to egotistical and anti-social feelings is naturally diminished. It may mean that the junior high-school teachers have become more skillful in detecting and heading off such tendencies, or that the Miller plan of differentiated assignments is especially good in preventing their development.

5. There was a decided weight of opinion that the grouping does not develop inferiority feelings in the dull pupils. The opposite view, however, was held by about one-third of the group.

6. It was generally believed that grouping does not brand or stigmatize the pupil, *if it is properly administered*. It is thus reasonably clear that it is not ability grouping itself, but rather the attitudes and actions of teachers which stigmatize pupils.

7. Grouping does not cause the bright child to put forth less effort. In fact, he is generally stimulated to exert himself to a greater degree than he is in a heterogeneous group.

8. In the junior high school, pupils in the lower groups are not limited to minimum essentials, but may go on to higher assignments whenever they have satisfactorily completed the lower ones.

9. The teachers did not believe that ability grouping limits the possibilities of development for the individual child. As used in Reading with plans for individualized instruction, the tendency is undoubtedly the other way, for each child is stimulated and encouraged to go as far as he can.

10. Teachers were generally alive to the needs for socializing activities and were providing many opportunities for this important phase of the school's work.

In conclusion, it may be said that the study clearly indicates the excellent possibilities of ability grouping carefully planned and wisely carried out. It is true that there are difficulties and dangers, and that not all the problems have been solved. When teachers and supervisors, however, thoroughly understand the philosophy underlying this type of school organization, and when they are willing to give some time and thought to the solution of the difficulties, it appears to offer decided advantages, to both teacher and pupil, over the old method of heterogeneous grouping.

AN OBJECTIVE METHOD OF DETERMINING READING DIFFICULTY

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THE difficulty of vocabulary in reading material is an exceedingly important factor in selecting textbooks and reading matter for children. For lack of a simple and reliable method of determining this difficulty, however, the attempts to adapt vocabularies to various grades and ages have been largely a matter of guess work or personal judgment.

Several methods of evaluating vocabulary difficulty have been suggested. S. L. Pressey and Bertha A. Lively[1] worked on the theory that the higher the frequency of use, as discovered by Dr. Thorndike's study, the easier the vocabulary. This method they found rather cumbersome and inconvenient because each selection contained words of unknown frequency and, therefore, unknown difficulty. L. C. Pressey[2] made a study of the technical vocabulary, believing that the percent of technical words employed might be a measure of the vocabulary burden of a given textbook. She did not proceed, however, to use it as such a measure. Washburne and Vogel[3] worked out a formula which they found satisfactory for the grade placement of books by combining in certain proportions the following elements:

1. The number of different words that occur in a sampling of 1000 words.
2. The number of uncommon words found in a 1000 word sampling, as determined by the Thorndike list of 10,000 words.
3. The number of prepositions in a 1000 word sampling.
4. The number of simple sentences estimated in a sample of 75 sentences.

Alfred S. Lewerenz[4] reported a study made by the Educational Research Division of the Los Angeles Public Schools. By comparing the

[1] Pressey, S. L., and Lively, Bertha A. "A Method for Measuring the Vocabulary of Textbooks." *Educational Administration of Supervision*, IX, (October, 1913), pp. 389-398.

[2] Pressey, L. C. "Determination of the Technical Vocabulary of School Subjects." *School and Society*, XX, (July 19, 1924), pp. 91-96.

[3] Washburne and Vogel. "An Objective Method of Determining Grade Placement of Children's Reading Material." *Elementary School Journal*, January, 1928.

[4] Lewerenz, Alfred S. "Measurement of the Difficulty of Reading Material." *Educational Research Bulletin, Los Angeles City Schools*, VIII, March, 1929.

number of different words beginning with each letter of the alphabet in a given selection with that of the standard provided by Webster's Elementary School Dictionary, five critical letters were selected as indicators of reading difficulty. Words beginning with W, H, and B were found frequently in easy material while there were comparatively few beginning with I and E. With difficult reading material the situation was reversed.

The purpose of this article is to present a method of determining the difficulty of reading matter which is simple to administer, and at the same time reliable. Briefly stated: *The percent of polysyllabic words is a measure of the difficulty which children will have in reading the book.* This is true, not because difficulty is related intrinsically to the length of words, but rather because the length of words varies, on the average, in accordance with frequency of use and consequently with familiarity. A random sampling of 3000 words has been found, by experiment, to yield a fairly reliable measure of difficulty of any book under consideration.

The accuracy of this determination of difficulty may be corroborated in several ways. The corroborative evidence presented in this article is derived from studies made by assistants in the Division of Tests and

TABLE I

MENTAL AGE, IQ, AND SCORES ON READING TEST OF TWO GROUPS OF STUDENTS

	Score		Mental Age		IQ	
	Long	Short	Long	Short	Long	Short
Third Quartile	60.6	72.9	13–2	13–3.3	117.9	118.2
Median	43.8	64.7	12–2.4	12–3.3	103.3	104.4
First Quartile	31.2	52.9	11–2.6	11–3.9	95.3	95.3

TABLE II

PERCENT OF POLYSYLLABIC WORDS IN EACH SUCCESSIVE 500 WORDS IN THE THORNDIKE LIST

Groups of Words in Thorndike List	Percent of Polysyllabic Words
1– 500	22.6
500–1000	41.0
1000–1500	53.6
1500–2000	56.4
2000–5000	64.2

Measurements in St. Louis. The data presented in Tables I, II, and III have been taken from a study presented by Miss Mata V. Bear at the University of Chicago;[5] and the remaining data are obtained from an unpublished official report submitted by Miss Mabel E. Boss.

[5] Bear, Mata V. "The Length of Words as an Index of Difficulty in Silent Reading." A Master's Thesis filed in the University of Chicago Library, August, 1926.

TABLE III

PERCENT OF POLYSYLLABIC WORDS IN STANDARD READING TESTS

Tests	Percent of Polysyllabic Words
Gray's Silent Reading Test	
Grades II and III	17%
Grades IV, V, and VI	22%
Grades VII and VIII	33%
Gray's Oral Reading Test	
Paragraphs 1, 2, 3, and 4	11%
Paragraphs 5, 6, 7, and 8	27%
Paragraphs 9, 10, 11, and 12	42%
Stone Narrative Reading Test	
Grades III and IV	18%
Grades V and VI	23%
Grades VII, VIII, and IX	29%
Stanford Reading Tests, A.B.V.W.*	
Grade II	18.5%
Grade III	20.8%
Grade IV	23.8%
Grade V	24.8%
Grade VI	24.2%
Grade VII	33.1%
Grade VIII	35.5%
Whipple's High School and College Reading Test	
Form A	37%
Form B	38%
Thorndike-McCall Reading Tests Forms 1-9**	
Group I	18.0%
Group II	21.5%
Group III	27.6%
Group IV	30.9%
Group V	35.7%

* The test was considered as scaled and so of increasing difficulty. The grade norms provided for each section of the test furnished one basis for these grade divisions.

** These groups were formed by ranking the paragraphs which constitute the test in the order of their placement in the nine forms and then obtaining the average rank for each paragraph. Since the paragraphs have been carefully graded and scaled, these average ranks may be considered a good index of their relative difficulty. These averages fell into very definite groupings and are given above as Groups I, II, III, and IV. Group V is suitable for high-school and college students.

1. An experiment was conducted in which the same reading content was presented to two equally capable groups of 123 students each. For one group, as many monosyllabic words as possible were introduced into the story, but for the other group many synonymous polysyllabic words were substituted. The two versions, of approximately 800 words each, had the same vocabulary then except in the case of 83 words which were monosyllabic in one version and polysyllabic in the other. The result of this experiment showed that most of the pupils made high scores in the short word test while many of those taking the long word test made low scores. The wide difference in score between these two equated groups indicates that the monosyllabic word test was strikingly less difficult than the polysyllabic word test. The mental age, IQ, median, and quartile scores for each group are given in Table I.

2. The percentage of polysyllabic words in the first five successive groups of 500 words in the Thorndike list increases with each group, indicating that as the words decrease in frequency of use, they increase in length. The percentage of polysyllabic words for each group is shown in Table II.

3. The vocabulary of certain standard reading tests, the general difficulty of which has already been experimentally determined, showed an increase in polysyllabic words from grade to grade. These facts are shown in Table III.

4. Books expressly written for consecutive grades, such as a series of readers or language books, showed an increase in polysyllabic words from grade to grade. The percent of polysyllabic words in each grade for four selected series of books written for specific grades is shown in Table IV. These four books are designated as Reader A, Reader B, Geography, and Language. The average of these four series will serve to suggest tentative norms in percentage of polysyllabic words in the different grades.

TABLE IV

PERCENT OF POLYSYLLABIC WORDS IN BOOKS WRITTEN FOR SPECIFIC GRADES

	Reader A	Reader B	Geography	Language	Average
Primer	14.3	12.3			13.3
Grade I	14.6	14.8			14.7
Grade II	15.7	19.3			17.5
Grade III	17.5	18.4	18.3	19.6	18.4
Grade IV	21.3	22.0	23.5	20.8	21.9
Grade V	23.7	24.5	26.3	23.6	24.5
Grade VI	24.8			26.5	25.6
Grade VII	27.1			27.6	27.3
Grade VIII	28.1			30.4	29.2

5. The use of this measure gives results corresponding to those found when the percent of technical words is computed. The count of technical words, based on the Pressey Technical Vocabulary lists, gives the same relative rating to books as does the count of polysyllabic words. This may be shown by a study of four history and three home economics books, the results of which are given in Table V. For the purpose of publication, the history books are designated as A, B, C, D, and the home economics books as X, Y, and Z.

6. Books of a general reading character are also measurable by the count of polysyllabic words. Because books of fiction are not written for any definite age level, as is true in the case of most textbooks, and because we do not know at what level a book is most enjoyed and appreciated, definite norms cannot be established without further experimentation. Books on graded supplementary reading lists, however, such as the Winnetka[6] and the Terman and Lima[7] list showed an increasing number of

[6] Washburne and Vogel. *Winnetka Graded Book List,* American Library Association, 1926.

[7] Terman and Lima. *Children's Reading.* New York: D. Appleton & Co., 1926.

TABLE V

PERCENT OF POLYSYLLABIC WORDS IN FOUR HISTORY BOOKS AND THREE HOME ECONOMICS BOOKS

Text	Percent Polysyllabic	Percent Technical
History		
A	34.5	12.2
B	34.5	7.7
C	32.8	7.5
D	31.8	6.0
Home Economics		
X	36.3	13.0
Y	31.5	10.8
Z	31.0	9.8

polysyllabic words from grade to grade. These percents are somewhat lower than are the percents for textbooks, indicating that fiction has a less difficult vocabulary. Whether this is a condition that should exist is questionable, and any conclusion regarding it would have to be based upon experimentation.

The measure of reading difficulty which has been described in this article applies only to general reading matter. Poetry, figures, or matter outside the realm of general reading cannot be measured in this way. In the realm of general reading matter, however, it would seem possible, from the data here presented, to develop desirable norms or standards for reading difficulty in the various grades, and for the various types of matter to be read.

In applying the count of polysyllabic words as a measure of difficulty the quickest and most efficient method is to select thirty 100-word samplings at approximately equal distances throughout the book that is under consideration. By limiting a sampling to 100 words mathematical calculations are easy, and a random selection of material is assured. A 3000 word sampling has been found, experimentally, to be reliable; and the time involved in rating one book on this basis is approximately thirty minutes.

THE TENTH YEAR PROGRESS OF JUNIOR HIGH-SCHOOL AND ELEMENTARY SCHOOL PUPILS

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Is there a difference in achievement during the tenth year of the senior high school between those pupils who enter from junior high school and those who enter from elementary school? If there is, can this difference be measured in terms of our conventional school marks and grade progress? It is the purpose of this paper to answer this question in terms of the Central High School of Syracuse, N. Y. This study is, also, concerned with the relative progress of transfer pupils; the comparative ages, intelligence quotients, and attendance records.

The pupils enrolled in the Central High School of Syracuse are recruited from ten grade schools and four junior high schools. This school also includes transfers from parochial schools and transfers from other senior high schools who come for special subjects. The study is based upon the achievement records for the first half of the tenth year for 984 pupils: 426 from grade schools, 432 from the junior high schools, and 126 transfer pupils. These 984 pupils were considered in six groups as follows:

1. Boys entered from city grade schools (BG)
2. Girls entered from city grade schools (GG)
3. Boys entered from junior high schools (B JHS)
4. Girls entered from junior high schools (G JHS)
5. Boy transfers (BT)
6. Girl transfers (GT)

Two factors contribute to the reliability of the data: first, the number of cases, and second, the fact that the data were obtained over a period of two years: namely for the fall semester, 1926; the spring semester, 1927; the fall semester, 1927; and the spring semester, 1928.

The Roosevelt Junior High School furnished more than one-half of all the pupils coming from junior high school, the Madison school more than one-fourth.

According to Table II the total number of pupils were grouped as follows: 426 from the grades, 432 from the junior high schools, and 126

TABLE I

SHOWING NUMBER OF PUPILS FROM THE VARIOUS JUNIOR HIGH SCHOOLS

School	Boys	Girls	Total Number	Percent
Roosevelt	125	121	246	57 %
Porter	15	14	29	6.7%
Lincoln	23	19	42	9.8%
Madison	70	45	115	26.5%
Totals	233	199	432	100 %

TABLE II

SHOWING NUMBER OF PUPILS IN THE VARIOUS GROUPS OF THE STUDY

	Transfer		Grade		J H S		
	Boy	Girl	Boy	Girl	Boy	Girl	Total
Fall 1926	10	23	69	45	69	53	269
Spring 1927	9	10	60	56	48	46	229
Fall 1927	20	24	38	57	50	54	243
Spring 1928	17	13	49	52	66	46	243
Total	56	70	216	210	233	199	984

transfer pupils. There is a difference of only six pupils between the grade group and the junior high school group. There were fewer transfers in the spring term than in the fall term.

TABLE III

SHOWING AGE MEDIAN FOR VARIOUS GROUPS

	Transfer		Grade		J H S	
	Boy	Girl	Boy	Girl	Boy	Girl
Fall 1926 M	191	183	190	184	183	184
Spring 1927 M	189	181	188	183	184	180
Fall 1927 M	187	184	191	183	184	180
Spring 1928 M	197	187	184	187	186	182

Note: M indicates median. Age is expressed in months.

The junior high-school girls, spring and fall 1927, are the youngest pupils (Table III). The median for each of these groups is 180. The oldest group is the transfer boys, spring 1928. The range between these two medians is approximately one and one-half years.

A comparison of the two columns at the extreme right of Table IV shows that the grade pupils have a better record for success in the school subjects than do the junior high school pupils. English is the one exception to this statement. The percentage of failure in Latin and geometry is marked for both groups, but appreciably higher for the junior high school group. Algebra should have been completed by all pupils at the end of the ninth year. Hence, the algebra pupils in a particular term are either repeating that term or have repeated the first

TABLE IV

SHOWING NUMBER OF PUPILS IN THE DIFFERENT GROUPS CHOOSING VARIOUS SUBJECTS AND THE NUMBER OF FAILURES

	B T	G T	B G	G G	B JHS	G JHS	Sum G	Sum JHS
N	48	66	193	197	219	199	390	418
En	48	66	193	197	219	195	390	414
Ef	12	5	30	18	24	10	48	34
E%	25%	7.5%	15.5%	9%	11%	5%	12.3%	8.2%
Fn	16	30	71	80	90	108	151	198
Ff	10	12	22	15	29	25	37	54
F%	62%	40%	31%	19%	32%	23%	24.5%	27%
Ln	29	40	99	135	181	142	234	323
Lf	12	14	31	40	75	38	71	113
L%	41%	35%	31%	30%	41%	27%	30.3%	35%
An	14	13	42	40	66	59	82	125
Af	2	4	13	9	31	27	22	58
A%	14%	31%	31%	22.6%	46%	46%	27%	46.5%
Gn	32	33	128	98	144	107	226	251
Gf	18	19	47	43	57	52	90	109
G%	56%	57%	37%	44%	40%	49%	40%	43.5%
Hn	30	31	136	90	128	66	226	194
Hf	9	12	21	21	24	15	42	39
H%	30%	39%	15%	23%	19%	23%	18.6%	20%

Note:
N—indicates the number of pupils in each group choosing six comparable subjects. They are English, French, Latin, algebra, geometry, and history. These were the subjects of most general appeal and hence most suitable for the study.
n—indicates the number choosing each subject.
f—indicates the number of failures in each.
%—indicates the percent of pupils failing each subject.

half of the year's work. The transfer pupils, as shown in Table IV, have a lower record in every subject, except algebra, than either the grade group or the junior high school group. Of forty-eight boy transfers, 12, or 25 percent, failed English. The gross amount of failure among transfers would seem to indicate the costliness of this group to the community. The median IQ of this boy transfer group is 91. Altogether three and one-half percent more pupils failed in the junior high-school group than in the grade group. So, the relation of transfer to failure—which is cause and which effect—is a problem for the environmentalists and hereditarians to conjure with. Both groups would probably agree that adjustment to the new environment through transfer usually means curtailment of the pupil's progress. The median IQ's for the various groups, measured by the Miller Test of Mental Ability, are: BT, 91; GT, 107; BG, 118; GG, 114; B JHS, 103; G JHS, 117.

Table V reveals the same general tendencies as Table IV. The grade group has consistently higher specific subject medians than either the junior high-school group or the transfer group, while the transfer group

TABLE V

SHOWING SUBJECT MEDIANS FOR DIFFERENT GROUPS FOR THE FOUR SEMESTERS

Fall	1926	English		French		Latin		Algebra		Geometry		History	
	N	n	M	n	M	n	M	n	M	n	M	n	M
B T	10	7	77	3	50	6	65	3	80	5	60	3	75
G T	23	22	80	9	65	14	75	3	69	11	60	9	60
B G	69	63	78	25	75	44	77	13	66	41	75	43	81
G G	45	45	85	12	75	34	76	13	75	19	75	23	85
B JHS	69	65	80	26	75	52	65	23	65	36	75	37	82
G JHS	53	52	85	20	80	32	75	23	70	18	75	18	78
Spring	1927												
B T	9	8	75	3	50	5	75	1	75	7	75	6	65
G T	10	9	77	4	72	5	70	2	62	2	90	4	80
B G	60	52	78	16	75	31	75	12	70	33	75	42	82
G G	56	53	80	24	85	35	81	10	75	26	75	25	77
B JHS	48	44	78	20	75	36	75	10	55	34	75	22	83
G JHS	46	46	85	25	80	33	79	10	75	25	75	14	85
Fall	1927												
B T	20	19	75	5	70	13	75	5	71	12	60	11	80
G T	24	23	83	11	75	12	81	4	75	14	76	10	76
B G	38	34	81	10	80	24	77	9	75	23	80	24	85
G G	57	56	83	17	85	36	78	7	60	31	70	24	85
B JHS	50	48	81	17	85	39	78	8	78	36	75	29	85
G JHS	54	52	83	39	82	41	78	11	75	39	60	18	80
Spring	1928												
B T	17	14	75	5	78	5	77	5	70	5	75	10	75
G T	13	12	80	6	75	9	80	4	88	6	75	8	75
B G	49	44	80	20	75	30	80	8	81	32	75	27	76
G G	52	45	85	23	77	30	80	10	78	22	75	18	82
B JHS	66	62	80	27	82	54	75	25	71	38	75	40	75
G JHS	46	45	80	24	77	36	80	15	65	25	70	16	80

consistently ranks at the bottom, except in algebra. Table V shows that in terms of specific subject medians the grade group of pupils consistently excels the junior high-school group.

Table VI shows that there seems to be no particular advantage relative to absence and tardiness for either the grade group or the junior high-school group. The transfer pupils had the poorest record in both absence and tardiness. This, to a certain degree, is probably due to lack of proper articulation between schools. Table VI shows that 19 of the 24 groups failed to do a satisfactory term's work. The median count for each of these is less than 9¼ counts. Only one group, however, failed to show a median high enough to pass the grade. This variation is probably due to the more difficult work of the second year. The extra credits earned in the first year's work enabled some of these students to keep up

TABLE VI

SHOWING ATTENDANCE AND GRADE PROGRESS FOR THE VARIOUS GROUPS AND TERMS

Fall 1926	N	Absence		Tardiness		Counts	Total counts
		t	m	t	m	M	M
B T	7	36	5.14	3	.43	4¼	26¼
G T	22	190	8.3	12	.55	4¾	28¼
B G	63	343	5.44	56	.88	8¼	31½
G G	45	263	5.8	40	.88	7¾	30¾
B JHS	65	286	4.4	58	.89	7	29¼
G JHS	52	251	4.73	32	.6	7¼	30½
Spring 1927							
B T	8	31	3.9	11	1.4	6¾	30¼
G T	9	72	8	11	1.2	5¼	28½
B G	53	223	4.21	45	.84	7¾	30¼
G G	53	243	4.6	32	.6	8¼	32½
B JHS	44	161	3.64	33	.75	7¼	31½
G JHS	46	242	5.25	33	.71	7¾	32¾
Fall 1927							
B T	19	121	6.36	22	1.15	5	29¾
G T	23	158	6.5	9	.4	9¾	31¼
B G	35	161	4.6	20	.55	9½	31
G G	57	262	4.59	24	.42	8¼	32¼
B JHS	48	198	4.12	47	.98	7¾	31½
G JHS	52	270	5.2	30	.55	7¼	31¼
Spring 1928							
B T	14	170	10	25	1.5	5½	28½
G T	12	100	7.7	10	.78	9½	32¼
B G	44	320	6.5	28	.48	9¼	31½
G G	45	273	5.25	10	.2	9¾	31½
B JHS	62	407	6.2	31	.5	8½	31¼
G JHS	45	253	5.6	13	.3	8½	31

Note:
N—indicates the net enrollment or total enrollment minus the mortality.
t—indicates total absence or total tardiness for the term.
m—indicates mean absence or tardiness.
count—indicates the unit of accrediting (One period a week for a year).
M—indicates median number of counts earned.

with the grade although the amount of work done was less than 9¼ counts. Table VII aids in interpreting Table VI.

In Table VII the promotion data of the various groups for the four terms are tabulated. It supplements Table VI with a record of those who did a full term's work, and of those who failed to do so. The number passing the grade is also compared with those failing to secure the required counts. An analysis of Table VII shows that 52 percent of the grade group and 64 percent of the junior high-school group failed 9¼ counts; 18 percent of the grade group and 27 percent of the junior high school group failed 27¾ counts.

TABLE VII

SHOWING GRADE FAILURE AND RETARDATION OF VARIOUS GROUPS

	Mort.	Retarded		Accelerated			Counts		Grade	
		s	g	t	n	x	p	f	p	f
B T	8	27	33	4	3	1	16	32	29	22
G T	4	28	30	4	2	2	30	36	45	21
B G	21	91	174	12	6	3	93	102	161	40
G G	10	63	93	23	15	8	94	106	164	36
B JHS	14	84	99	14	8	6	80	139	146	73
G JHS	4	49	57	17	14	3	70	125	157	38
T Grade	31	154	267	34	21	13	187	208	325	76
T JHS	18	133	156	31	22	9	150	264	303	111

Note:
Mort.—indicates mortality for those who left during term.
Retarded—indicates loss of one or more terms.
s—indicates number of pupils retarded.
g—indicates total number of grades retarded.
accelerated—enough counts to skip a grade.
t—indicates total acceleration.
n—indicates not previously retarded.
x—indicates previously retarded one or more grades.
counts—explained above.
p—indicates success.
f—indicates failure.
Grade—indicates the passing or failing of the grade. 27½ counts are necessary to pass grade.
T—indicates totals of boys plus girls.

Table VII shows that the record of promotions is much better for the grade group than for the junior high-school group. The acceleration shows that half the retardation of the junior high-school pupils is made up at the end of the term. Forty percent of the grade retardation is balanced by extra counts. A detailed study of spring and fall terms reveals considerably less retardation in the spring terms than in the fall. In this detailed study of terms, however, the record of the grade pupils who passed the grade is much better than that of the junior high-school pupils.

TABLE VIII

SHOWING MEDIAN IQ OF THE VARIOUS GROUPS

	M
B T	91
G T	107
B G	118
G G	114
B JHS	103
G JHS	117

Note: M—indicates median IQ.

Table VIII shows that the elementary school pupils are more highly selected on the basis of general intelligence. The IQ's in Table VIII are based on the Miller Mental Ability Test. The junior high-school pupils rank next in general intelligence. The boy transfers, with a median IQ

TABLE VI

SHOWING ATTENDANCE AND GRADE PROGRESS FOR THE VARIOUS GROUPS AND TERMS

Fall 1926	N	Absence		Tardiness		Counts	Total counts
		t	m	t	m	M	M
B T	7	36	5.14	3	.43	4¼	26¼
G T	22	190	8.3	12	.55	4¾	28¼
B G	63	343	5.44	56	.88	8¼	31½
G G	45	263	5.8	40	.88	7¾	30¾
B JHS	65	286	4.4	58	.89	7	29¼
G JHS	52	251	4.73	32	.6	7¼	30½
Spring 1927							
B T	8	31	3.9	11	1.4	6¾	30¼
G T	9	72	8	11	1.2	5¼	28½
B G	53	223	4.21	45	.84	7¾	30½
G G	53	243	4.6	32	.6	8¼	32½
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In Table VII the promotion data of the various groups for the four terms are tabulated. It supplements Table VI with a record of those who did a full term's work, and of those who failed to do so. The number passing the grade is also compared with those failing to secure the required counts. An analysis of Table VII shows that 52 percent of the grade group and 64 percent of the junior high-school group failed 9¼ counts; 18 percent of the grade group and 27 percent of the junior high school group failed 27¾ counts.

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Mort.—indicates mortality for those who left during term.
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Note: M—indicates median IQ.

Table VIII shows that the elementary school pupils are more highly selected on the basis of general intelligence. The IQ's in Table VIII are based on the Miller Mental Ability Test. The junior high-school pupils rank next in general intelligence. The boy transfers, with a median IQ

of 91, represent an inferior group on the basis of general intelligence as measured by the Miller Mental Ability Test. An examination of the foregoing data of this study shows that the three groups of pupils rank in the same order in tenth year progress and in IQ. It is probable that the IQ is the most significant factor in determining the relative position of the three groups in school achievement.

CONCLUSIONS

1. This study represents one effort to measure the comparative success of pupils from the elementary grades and the junior high schools in academic success in the tenth year of the senior high school. The results of this study indicate that in terms of one typical school situation, pupils from elementary grade schools do somewhat better work in the tenth year of the senior high school than pupils from junior high schools. The medians for every subject except English show an advantage in favor of the grade entrants; in algebra the percentage of failures for the junior high-school pupils is almost double the failure of grade school pupils.

2. Grade failures which determine the retardation for the next term, show a substantial difference in favor of the grade school pupils.

3. Transfer pupils, in general, do poorer work than those from the grade group. Pupil transfer seems to indicate a serious economic waste to the community.

4. The IQ appears to be a very significant factor in determining the relative position of the three groups in tenth year progress.

5. The differences in achievement shown in this study apply to academic school work only, and specifically: English, French, Latin, algebra, geometry, and history. This study does not measure progress in the fine arts, physical education, home making, practical arts, etc.

6. Two considerations should be kept clearly in mind in the interpretations of these data:

(A) The elementary school pupils come from a conventional organization (elementary school) and are tested in terms of a conventional organization (senior high school).

(B) The junior high-school pupils come from a liberal organization (junior high school) and are tested in terms of a conventional organization (senior high school).

A detailed study of the Roosevelt Junior High School, reported else-

where,[1] shows that its aims, organization, curriculum, extra-curricular and citizenship activities are based upon a liberal conception of secondary education. The principal of the Roosevelt Junior High School believes that the chief educational outcomes of his school cannot be measured in terms of final examinations and school marks. It is evident to the writers that similar aims and functions characterize the other junior high schools which have been found in the detailed study of the Roosevelt Junior High School.

7. This study measures, chiefly, knowledge values. It provides no comparative measurements in the field of extra-curricular, social, or citizenship qualities.

8. In the interpretation of the above data, it should be recognized that the junior high schools of the study are yet young. If the peculiar functions of the junior high school are sound, the statistical data of this study show, not the inefficiency of the junior high schools, but the need for articulation between the junior high schools and the senior high schools.

9. Finally, the interpreter of these data should recognize that the criteria of success in this experiment have been determined solely by the senior high school. A detailed study of one junior high school and a less critical study of the other schools, lead the writers to conclude that the elementary schools and the senior high school place more emphasis on the formal aspects of teaching than do the junior high schools.

10. To conclude from this study that junior high schools are inefficient would be statistical sophistry. It might be just as reasonable to conclude that the elementary schools and the senior high school are inefficient. One who deigns to play with figures should recognize that he can do almost anything with a "statistic" if he will treat it kindly. The fundamental problems involved in this study are not of the rule-of-thumb, "two-plus-two-equals-four" variety. A lonely statistic finds itself overwhelmed by a host of major problems such as:

1. Should the junior high school and the senior high school have definite objectives of their own?
2. Is it fair to judge junior high-school pupils by standards framed solely by the senior high school?
3. Are there not other values achieved in junior high school which

[1] Clem, Orlie M., and Malloy, Kathie V. "Some Individual Differences of Pupils in a Typical Junior High School," *Educational Administration and Supervision*, XVI, (Jan., 1930), pp. 39-52.

more than compensate for a few points difference in academic achievement?

4. Do these results not indicate a lack of articulation between the junior high schools and the senior high schools?
5. Does the attitude of senior high-school teachers toward the two groups have an influence?
6. Are the results of this study not due to the more formalized methods of teaching in the elementary schools and the senior high school?
7. Would similar results be secured if the experiment should be duplicated after a few more years of articulation and reorganization?

These problems cut deep into and entirely across the fields of aim, curriculum, organization, and method. One statistic cannot give the answer to these fundamental problems; probably science alone cannot do it. As Dr. Hullfish has recently suggested, educational philosophy needs to be consulted for the ultimate determination of integrated programs, when such basic problems are involved.[2] The slow accumulations of science provide the raw data for thinking. This study attempts to answer fragmentarily one question for one specific set of conditions.

[2] Hullfish, H. G. "The Relation of Philosophy and Science in Education," *Journal of Educational Research*, Oct., 1929.

EDITORIALS

ON ASSIGNED MARKS

A few years ago an instructor in the summer session of a university of the American Association had fourteen students in a course which treated of socialized behavior, socialized recitation, and other allied topics. According to the marking system that he used, seven percent of the class were to receive A's, twenty-three percent B's, forty percent C's, twenty-three percent D's, and seven percent E's or failures. At the end of two weeks a comprehensive quiz was given and, of course, one student was marked "failure." Now, just what was that student to do? Should he work hard to raise his mark? If he did, some other student would get the failure, because the situation was clearly a case of "button, button, who's got the button?" If the student, though comparatively slow in organizing the knowledge involved, was sensitive to the purposes, then he might accept the failure as his contribution to social behavior and thus protect some other student from being marked "failure." In that case his study has resulted in a desired action. He has applied in his behavior a principle of social reaction and should, therefore, receive a passing mark. This case is probably not too far fetched to illustrate the absurdity of applying the theory of probability to small samples.

Writers on educational measurements usually note certain conditions that must be present in order to justify assigning marks according to the probability distribution: N, should be large, or if small (say 40) should be known to be a truly random sample of a large population, or the result of other conditions known to insure a chance distribution. Under these circumstances it is justifiable to assign marks according to the probability distribution. When reverse conditions obtain, we should discover what the distribution actually is by measuring the trait in question. We would not, for example, assume a probability distribution for the height of 40 sixth-grade boys, but would measure their heights, arrange a table of frequencies, and determine the actual distribution. To determine the distribution of achieved abilities, the tests we use should be known to be valid and reliable measures of the particular achievement under measurement. Only so far as our tests are true measures of the particular achievement is it pos-

sible to make a true distribution of grades. If we do not have adequate tests, then the probability distribution is all that is left as a guide to our judgment.

Another practice often recommended is that of assigning, to students whose scores are at the class average, the average for school marks and of distributing the remaining marks above and below average according to the probability curve. In certain instances this practice is particularly fallacious, as when the mastery of a definite bit of subject matter is the object of instruction. If the average pupil has mastered only half of the content that he is expected to master, and if an absolute scale of grading is accepted, why should he be given a mark of "C," or a percentage the equivalent of 75 or 80? Should he not understand that half-mastery is unsatisfactory? If the pupil's instruction has been faulty, should not the teacher assume responsibility for the grade? Of course, if there is no definite content to be mastered, then we can measure only the response due to general intelligence ability, and we may assign an average mark to the average pupil of the class. In doing this we would skew the probability distribution toward the high side as a means of recognizing the effects of instruction.

Instructional problems are likely to be solved neither by assuming that a certain form of distribution pertains, nor by assigning marks from an assumed norm.

"It is the folly of the ignoramus in statistics to neglect the application of the algebraic laws of combinations to variable phenomena; it would be the folly of the pedant to try to bend all the variety of nature into conformity with the one particular case of the frequency of combinations which results in Form A (the probability or so-called 'normal' curve) for the total distribution."[1]

The chief justification of *assuming* the probability distribution in assigning marks lies largely in our ignorance of the actual form. Whenever possible the form of distribution should be determined by our tests. The concept of mastery of a given unit of subject matter precludes giving the pupil at the average of the class an average mark when his degree of mastery considered on an absolute scale is far above or far below mediocrity. In the latter case the pupil's achievement may fall much below what it should be. In the former, his teacher may be smugly content with instruction which is far below an acceptable standard of efficiency.

FOWLER D. BROOKS

[1] Thorndike, E. L. *Introduction to the Theory of Mental and Social Measurements*, (1913), p. 89.

REVIEWS

Address all communications relative to book reviews to Editor E. J. Ashbaugh, Miami University, Oxford, Ohio.

HENMON, V. A. C., AND OTHERS. *Prognosis Tests in the Modern Foreign Languages.* New York: Macmillan Company, 1929. xviii + 182 pp.

The question of prognosticating ability to learn a foreign language has been up for some years.[1] It was left for the Modern Foreign Language Study to stimulate the construction of additional tests and to administer all of them.

The problem is not an easy one since we are dealing here, not with a unitary ability as has generally been supposed, but with a number of separate and closely related abilities none of which function separately from the general intelligence. At all events it has been found that the intelligence test gives as fair a prognosis as any one of the linguistic prognosis tests taken singly. It is only when the intelligence test is used in connection with one or more of the linguistic tests that a really significant correlation with classroom marks and other tests is obtained.

An interesting fact brought out by a questionnaire for this study of prognosis is that 455 out of 672 selected teachers stated that there is a special language ability because they knew of numerous pupils having high intelligence who, nevertheless, failed in foreign language work. It is plain, however, that we need tests which will try out the special abilities in isolation. An attempt to do this is described in Chapter VII which is discussed later.

For the present it is thought that it may be possible to ascertain the IQ level, and the general scholarship level, below which success is highly improbable and to section pupils accordingly. Classroom marks and scores made on achievement tests may make it possible to eliminate the unfit at the end of the first semester or even earlier.

As a further criterion, ability in the study of the mother tongue was found to be indicative. A pupil with a poor record in English has little chance of success in a foreign language. This was shown by Binet over a quarter of a century ago. We know, however, that a pupil with a large English vocabulary has more ability to use correlations with cognates, of which good modern language teaching makes considerable use.

We find that the mortality in modern language classes is high. Why? It is believed that the pupil is more poorly prepared to study modern language than almost any other college or high-school subject; he had more experience with the other subjects in the lower grades.

A most significant study is that in Chapter VII, "The Psychological Fundamentals of Linguistic Achievement." Here is a serious beginning to sequester special language abilities. The general discussion is hereby recommended to mod-

[1] The writer published his *Predetermination Test* in the *Modern Language Journal* of October, 1918, later published for classroom use by the United States Bureau of Education. The Wilkens *Prognosis Test* which followed the same lines was published some years later and used extensively in New York City.

ern language teachers. The factors so far tested are memory, capacity, extent of the English vocabulary, range of information and intelligence level. These are shown to possess no significant correlations with ability in modern language study.

The findings of the tests may be summarized thus: It is very doubtful that there is a special talent or ability for languages. Those who achieve well in languages do well also in other studies. What has been thought of as special ability in language is now thought to be some peculiarity of the volitional personality or to accidental circumstance.

Chapter VIII reports the measurement of aptitude in learning foreign languages. It was found that of the Wilkens and Handschin prognosis tests, the parts dealing with grammar correlate best with other criteria. The highest correlation (.629) was obtained when the following tests were used in combination: Thorndike, *Word Knowledge, Artificial Language, Terman Group,* and Handschin, parts a, b, c.

C. H. HANDSCHIN
Miami University

MARINE, EDITH LUCILE. *The Effect of Familiarity with the Examiner upon Stanford-Binet Test Performance.* New York. Teachers College, Columbia University, 1929. 42 pp.

In this study Dr. Marine was concerned with the effect on young children of familiarity with an examiner (herself) upon Stanford-Binet test performance compared with previous performance upon two group tests (Pintner-Cunningham Primary and Detroit First-Grade Intelligence). Her subjects included 22 pairs of children from the Horace Mann School, New York City; 24 pairs from Public School 165, New York City; and 16 pairs from Newton school, Toledo, Ohio, ranging in chronological age from three years, eight months, to seven years, nine months, and taken from the junior kindergarten, kindergarten, and first and second grades.

The children were paired on the basis of chronological age, and a mental age score derived from the average of the mental ages on the two group tests mentioned. Conditions were so arranged that one child of each pair became familiar with the examiner by being told stories by her, playing with her, etc., for four days, these children coming to her in groups of from three to five. Each child of the "familiar" group was given the Stanford-Binet test on the same day as his peer in the "unfamiliar" group, the testing being done during the week following that in which the examiner became acquainted with each small group. Gains and losses in IQ points on the basis of the later performance as compared with the group tests given earlier were used as the measure of the effects of familiarity.

On the average the children in the "unfamiliar" groups gained in IQ as much as the children in the "familiar" groups. Also, average scores on the Binet tests involving language were practically identical for the two groups. The investigator concluded that "the degree of *rapport* ordinarily secured by the writer when testing an unknown little child with the Stanford-Binet elicited as high an intelligence rating as when there was considerable degree of familiarity between her and the child."

The importance of investigation in this field is well discussed in the author's chapter on historical background. If, as some psychologists have suggested, some children (especially young children) do not do themselves justice on a test because of shyness and unfamiliarity with

the examiner, we need to alter our testing procedure on the basis of experimental findings. Educators and psychologists will welcome Dr. Marine's experimental approach to the problem of the influence of familiarity with the examiner upon Stanford-Binet test scores. We may not, however, draw general conclusions from it, for several reasons: (1) Only one examiner participated in the experimentation. (2) All these children lived in large cities. It seems quite possible that this factor may facilitate the obtaining of *rapport*. (3) All these children had had opportunity to become adjusted to the school situation. The experiment at the Horace Mann School was carried on just before the Christmas holidays, and in the other schools still later in the same school year. (4) The children studied by Dr. Marine were considerably above the average in intelligence, as measured by the tests she used (average Binet IQ = 112). The preponderance of bright children is shown by the fact that while only one child of the 124 had a Binet IQ less than 82, 43 had IQ's above 118. Furthermore, while nine children had IQ's below 90, 58 had IQ's above 110, and 29 children had IQ's below 100, while 95 had IQ's above 100. While we may not assume that brightness in a child is an important factor in establishing *rapport* with the examiner, neither may we ignore it in a study such as this.

DORTHA W. JENSEN
Central Michigan Normal School

CAVINS, L. V. *Survey of Education in West Virginia.* Charleston, West Virginia: State Department of Education, 1929. vii + 160 pp.

The State of West Virginia is to be congratulated upon having obtained, in return for the expenditure of only ten thousand dollars, so much valuable information about the achievements of her public school pupils as is contained in this volume. This report is a splendid demonstration of the kind of study that can be made in a state when everyone concerned with education is anxious to learn the facts and willing to spend time and effort in helping to collect them. The professional spirit of this study is illustrated in the following quotation: "One college president walked five miles to give the tests to the children of a one-room school."

The two tests used most extensively in this survey were the Otis Self-Administering Tests of Mental Ability and the Stanford Achievement Tests. These were supplemented at various appropriate points by the Pintner-Cunningham Primary Mental Test, the Detroit Primary Intelligence Test, the Monroe Revised Silent Reading Test, the Cavins Poetry Test, the Pressey-Richards History Test, the King-Clark Foods Test, and the Iowa High-School Content Examination. The techniques employed in making sure that the schools tested were typical of all public schools in the state were excellent.

It is unfortunate that the chapter on the classification of pupils is not more complete. The data presented are only for those pupils who took the tests. The analysis of these data are neither complete nor very well presented. Furthermore, the presentation of the results of the achievement tests is less telling than it might have been. Too little use is made of graphic charts. Diagrams should have been used to clarify the real significance of the statistical data.

In the elementary grades it was found that the one and two-room schools were somewhat below national standards, except in spelling, while the city and con-

solidated schools were almost equal to the standards in each subject. In the secondary grades it was found that the West Virginia pupils were equal or superior to the pupils on whom the tests had been standardized. The greatest superiority of the West Virginia pupils was in knowledge of facts in science. The Negro pupils tested were not greatly inferior in achievement to the white pupils, except in English and in spelling.

The report says next to nothing regarding the mental test scores obtained. This omission may be due to the director's recognition of the unreliability of the mental tests used, but no clear explanation of the obvious slighting of the mental test scores appears. Another question which is too lightly touched in the report is that of the adjustment of the course of study to the needs and abilities of the pupils. But in spite of any statistical and pedagogical shortcomings of the report, the State of West Virginia obtained more than its money's worth from this study.

M. R. TRABUE

University of North Carolina

LEONARD, R. J., AND OTHERS. *Survey of Higher Education for the United Lutheran Church in America.* New York City: Bureau of Publications, Teachers College, Columbia University, 1929. xii + 389 pp.

This seems to be the most complete survey of its type which has been produced to date. The general aims were to present a general picture of the educational work of this church; to present an educational program for it; and to trace the development of its work in higher education. As a consequence we have the history, charter and legal restrictions; external and internal administration; instructional staff; student body; curricula; finances; physical plant;—all scrutinized from the standpoint of an educational program by those who have made an intensive study of educational administration.

It would be futile to attempt to review critically the three volumes in the limited space which can be used in this publication. Suffice it to say that each part of the work gives evidence of careful, unbiased, and critical thought, and the recommendations are in complete accord with the best that is conceived at the present time in the field of higher education.

MOORE, CLYDE B. *Citizenship Through Education.* New York: American Book Company, 1929. xv + 244 pp.

More and more we are coming to realize that the chief purpose of education should be to develop the right type of citizen. The author of this book has approached the subject in a broad, comprehensive way but has by no means confined himself to superficial generalities. He has shown in an excellent way how some of the fundamental principles of psychology may be applied in methods of teaching citizenship. Also, he shows clearly how through the social sciences the curriculum may be adjusted so as to help effectively in obtaining desirable objectives. One chapter is given to the measurement of citizenship, or character, a matter which is highly important and which is fast becoming a science. Both the educationist and the layman should find the book of much interest and value.

ROBERT P. CARROLL

Syracuse University

RESEARCH ABSTRACTS and BIBLIOGRAPHIES

Address all communications relative to research abstracts and bibliographies to Editor A. S. Barr, University of Wisconsin, Madison, Wisconsin.

BULLETINS

FERGER, WIRTH F. "Enrollment in the University of Wisconsin," *Bulletin of the University of Wisconsin*, May, 1929, 48 pp.

A statistical study of the probable enrollment of the University of Wisconsin: a review of the enrollment in the University of Wisconsin in the past; the Wisconsin school census; changes in the population of Wisconsin; estimations of the probable high-school attendance, of the number of graduates of public high schools, of the number of University of Wisconsin freshmen, of the undergraduate enrollment at the University of Wisconsin, and of the total enrollment at the University of Wisconsin; the migration of students to and from Wisconsin; and attendance in private colleges and state normal schools, including a survey of methods of forecasting enrollments.

FRANZEN, RAYMOND. "Public Health Aspects of Dental Decay in Children," New York: American Child Health Association, 1930. 121 pp.

A significant contribution to the health aspects of dental decay in school children with chapters on measurable aspects of oral hygiene; continuity of decay; effect of fillings upon dental decay; relation of enamel defect to school health policy; stain, tartar, and gingivitis; and application of the conclusions to the problem of dental measurement.

HOHENSTEIN, A. E. *Report of the Sixth Annual Nation-Wide Testing Program.* Bloomington, Illinois: Public School Publishing Company, 1930.

This bulletin contains a statement of the nature and scope of the program, reports for speed, vocabulary, paragraph meaning, reading, appreciative reading, and mechanical aptitude.

WITTY, PAUL A. "A Study of One Hundred Gifted Children," *University of Kansas Bulletin of Education.* Lawrence, Kansas: Bureau of School Service and Research, 1930. 44 pp.

A study of 100 gifted children, initiated in 1924 and concluded in 1929. The tests used included the National Intelligence Test, the Stanford Revision of the Binet-Simon Intelligence Test, the Stanford Achievement Examination, two Overstatement Tests, a test of versatility of play interests, physical measurement of height and weight and of physical development, information about environmental factors, family history, interests and aptitudes, social and moral traits, and such other information as is revealed by the school records. The bulletin presents a summary of the results of a follow-up study.

EXPERIMENTAL STUDIES REPORTED IN CURRENT ISSUES OF OTHER MAGAZINES

EDUCATIONAL ADMINISTRATION AND SUPERVISION

ALMY, H. C., AND SORENSON, HERBERT. "A Teacher-Rating Scale of Determined Reliability and Validity," *Educational Administration and Supervision*, XVI, (March, 1930), 179-186.

A discussion of a graphical rating scale with data relative to its validity and reliability.

BARR, A. S., AND RUDISILL, MABEL. "Inexperienced Teachers Who Fail—and Why," *Nation's Schools*, V, (February, 1930), 30-34.

This investigation was undertaken as a part of the follow-up program of the Supervisory Service Bureau of the University of Wisconsin. The material presented is based upon the difficulties met by graduates of the University of Wisconsin during their first and second years of teaching.

JAMES, H. W. "Causes of Teacher-Failure in Alabama," *Peabody Journal of Education*, VII, (March, 1930), 269-271.

A summary of the causes for the failure of 260 teachers. Poor discipline ranks first among the causes of failure.

JOHNS, W. B., AND WORCESTER, D. A. "The Value of the Photograph in the Selection of Teachers," *The Journal of Applied Psychology*, XIV, (February, 1930), 54-62.

No individual was found who possessed any particular talent for judging teaching ability from photographs. Apparently the chief value to be gained from the examination of a photograph is a general idea of "how one looks."

STEVENSON, FRED G. "A Study of Forms Used in Making Contracts with Public-School Teachers," *The Elementary School Journal*, XXX, (March, 1930), 525-532.

An analysis of the stipulations most frequently placed in teachers' contracts by boards of education.

EXPERIMENTAL STUDIES OF TEACHING AND LEARNING

BIRD, GRACE E. "A Successful Experiment in Child Education," *The Elementary School Journal*, XXX, (March, 1930), 539-546.

A review of the methods used in the Henry Barnard School, Rhode Island College of Education, with statistical evidence as to its effectiveness.

BOWMAN, HERBERT LLOYD. "The Relation of Reported Preference to Performance in Problem Solving," *The University of Missouri Bulletin*, XXX, (September 21, 1929), 52 pp.

An experimental testing of the theory of interest in relation to learning capacity. The bulletin contains a statement of the problem, the method of research, the subjects, procedures, results, etc.

HOVDE, HOWARD T. "The Relative Effects of Size of Type, Leading, and Context. Part II," *The Journal of Applied Psychology*, XIV, (February, 1930), 63-73.

Part II of an experimental study of the relative effects of size of type, lead-

ing, and context. From the results of this experiment it may be concluded that the context of the reading material is a more important factor in its effect on the reading rate, and consequently upon legibility, than the sensory material.

STEDMAN, MELISSA BRANSON. "Factors Influencing School Success in Bookkeeping," *The Journal of Applied Psychology*, XIV, (February, 1930), 74-82.

A study of the relationship between such abilities as those measured by the Terman Group Test of Mental Ability, subject matter tests in spelling, and arithmetic, the MacQuarrie Test of Mechanical Aptitude, the Thurstone Employment Test, and the Carlson Bookkeeping Tests.

WINCH, W. H. "Dates versus Centuries in Teaching Chronology to School Children," *The Forum of Education*, VIII, (February, 1930), 32-41.

The first of a series of experiments dealing with the relative merits of dates and centuries in teaching chronology. It seems from the results that the "date" group was overwhelmingly superior.

TEST CONSTRUCTION

CUFF, NOEL B. "Vocabulary Tests," *The Journal of Educational Psychology*, XXI, (March, 1930), 212-220.

The author points out that it would be very helpful to have an instrument with which to measure the extent of a child's vocabulary. His article is a discussion of the nature, functions, and limitations of vocabulary tests from this point of view.

FERNBERGER, SAMUEL W. "The Use of Equality Judgments in Psychophysical Procedures," *Psychological Review*, XXXVII, (March, 1930), 107-112.

A brief and critical discussion of the Method of Just Perceptible Differences which is of interest to psychological and educational workers.

HERRING, JOHN P. "The Measurement of Liking and Disliking," *The Journal of Educational Psychology*, XXI, (March, 1930), 159-196.

The author presents a plan for measuring likes and dislikes with extensive data bearing upon the validity and reliability of the measures proposed. Such measurements are important because of their relation to motivation, purposes, and human drives.

LINDQUIST, E. F. "Standard Response Error in a Measure of Improvement," *The Journal of Educational Psychology*, XXI, (March, 1930), 229-230.

A discussion of formulas for the probable error of a gain between the initial and final scores of a single pupil.

SYMONDS, PERCIVAL M., "A Foreign Language Prognosis Test," *Teachers College Record*, XXXI, (March, 1930), 540-556.

A description of a foreign language prognosis test with data relative to validity, reliability, and norms.

TESTS AND MEASUREMENTS

DEARBORN, WALTER F., AND CATTELL, PSYCHE. "The Intelligence and Achievement of Private School Pupils," *The Journal of Educational Psychology*, XXI, (March, 1930), 197-211.

A study of the intelligence and achievement of 1,295 pupils from 12 private schools in the vicinity of Boston.

SIMON, A. "*Pädagogische Bemerkungen zur Frage der Unbegabung* (Pedagogical remarks on the question of inaptitude)," *Internationale Zeitschrift für Individual-psychologie*, 1929, No. 5, 370-382.

The author presents a statement of Adler's thesis that all people are originally equally gifted, that the individual differences met with in children even at the first presentation of a new object are not expressive of differences in original natures, but of training and opportunity. He urges defenders and opponents of the theory alike to resort to the pragmatic test of experience for proof in their arguments, and cites in detail the case record of a hopelessly retarded habitual truant, successfully treated. This is followed by further detailed analysis and discussion of the theories of the inheritance of special abilities and deficiencies and their consequences for educational theory and practice. (Courtesy *Psychological Abstracts.*)

STOKE, STUART M., AND LEHMAN, HARVEY C. "Intelligence Test Scores of Social and Occupational Groups," *School and Society*, XXXI, (March 15, 1930), 372-377.

The authors conclude that the great majority of superior children come from non-professional classes, and from families that receive rather modest incomes. Intelligence test scores correlate rather loosely with social status, the correlations ranging from +0.30 to +0.40.

NEW TESTS

GLENN, EARL R., AND OBOURN, ELLSWORTH S. *Instructional Tests in Physics.* Yonkers-on-Hudson, New York: World Book Company, 1930.

A series of 25 tests dealing with physical phenomena and principles, industrial processes, vocabulary, numerical problems, laboratory work, interpretation of diagrams, etc., for different units of instruction in physics.

KELLEY, TRUMAN L., RUCH, GILES M., AND TERMAN, LEWIS M. *New Stanford Achievement Test.* Yonkers-on-Hudson, New York: World Book Company, 1930.

The New Stanford Achievement Test, Form X, is the third alternate form for the Stanford primary and advanced examinations.

LURIA, MAX A., AND ORLEANS, J. S. *Luria-Orleans Modern Language Prognosis Test.* Yonkers-on-Hudson, New York: World Book Company, 1930.

A new prognosis test for advising students who plan to study French, Spanish, or Italian.

OTIS, ARTHUR S., AND ORLEANS, J. S. *Standard Graduation Examination for Elementary Schools.* Yonkers-on-Hudson, New York: World Book Company, 1930.

This test covers the subjects of spelling, reading, vocabulary, arithmetic computation, arithmetic reasoning, grammar, language usage, literature, history, and geography. The test is accompanied by a manual of directions including a statement of the purpose and derivation of the examination, directions for administering, directions for scoring, recording scores, reporting score, and the application of results.

RESEARCH NEWS and COMMUNICATIONS

Address all research news and communications to Editor V. T. Thayer, Ethical Culture Schools, 33 Central Park West, New York City.

We are very glad to direct our readers' attention to a new and promising publication in the field of education, *The Journal of Higher Education*. This journal is issued under the editorship of W. W. Charters, Director of the Bureau of Educational Research, of Ohio State University, and is published by the Ohio State University Press. It is devoted to the presentation of the educational problems of college and professional schools. It has a board of associate editors, each representing one of the great fields of knowledge or one of the professional schools. It is planned that the board of editors will eventually include representatives of the subject matter fields in the colleges, of the major professional schools, junior colleges, and teachers' colleges. An international flavor is given the journal by the inclusion of a Canadian editor. To the list will be added representatives from other great universities of foreign countries. The following articles in the February number indicate the range of interests served: "Self-Education in Harvard College," "Propaganda and Leisure Reading," "Remaking the Psychology Curriculum," "The Students' Working Load," "Investigation of Engineering Education," and "With the Technicians."

Objective evidence of the growth of research is contained in the bibliography recently issued by the Educational Research Division of the New York State Education Department. This bibliography lists 127 research studies that are being carried on by men and women engaged in education in the state outside of New York City. The largest group of studies reported (containing nearly fifteen percent of the total) relates to the topic of "Individual Differences." The six largest classifications, individual differences, curriculum, historical, tests and testing, administration, and methods of teaching, account for about sixty percent of the total studies. Research workers in other states will find the bulletin helpful and illuminating.

Mr. Maris M. Proffitt has submitted a report to the Office of Education which indicates that increasing attention is being given to guidance in American public schools. He concludes that—

"American schools are placing more emphasis upon the theory and practice of educational guidance which may furnish opportunities for the gradual development and discovery of aptitudes and interests, and opportunities for gaining reliable information as to the training required for specific occupations and the employment conditions in the occupations."

He adds further,

"As an evidence of the tendency to increase the emphasis placed upon occupational studies as a part of a general guidance program, reports to the Bureau of Education (now the Office of Education) for 1927-28 from 215 representative

school systems in cities having a population of 10,000 or more, show that slightly more than one-half offer a course in occupations. Of the cities reporting which have fewer than 50,000 population, 40.4 percent offer such a course, while of the cities having more than 50,000 inhabitants 61 percent offer a course in occupations. Reports covering the year 1925-26, showed that only about one-third offered a course in occupations, thus indicating a gain of approximately 16 percent in the number of cities offering such a course."

Although the number of schools offering courses in occupations have increased, and although many teachers do some counseling and make contacts with industries to find employment for pupils seeking wage-earning positions, Mr. Proffitt points out that only a small percentage of schools have a coördinated and centralized program covering all phases of guidance. "Fewer still," he continues, "have such a program under the direction of one person employed with reference to his special qualifications for the work."

Further details regarding guidance programs in actual operation may be had by consulting Mr. Proffitt's biennial survey "Industrial Education," published as Bulletin No. 21, 1929, Office of Education.

An interesting and suggestive bulletin entitled *Cardinal Objectives in Elementary Education* has been published by the University of the State of New York, Albany, New York. This bulletin consists first of a report prepared by a Committee on Elementary Education of the New York Council of Superintendents which aims in particular to state the objectives of the public elementary school, and secondly of a series of reports by classroom teachers illustrating ways and means of obtaining these objectives.

The report is a most suggestive indication of the trend in elementary school teaching.

The Department of Research and Statistics of the Public Schools of Lynn, Massachusetts, has rendered a distinct service in compiling and presenting a bulletin called: *Some Recent Developments in Public Education.*

In this bulletin no attempt is made to review all of the developments nor have they attempted a critical evaluation of the various movements. The developments which have been chosen for comment are:

(1) The tendency to lengthen the period of education. The period now extends from the Nursery or Pre-Kindergarten School to the college or university.

(2) The department finds in the secondary school field the development of special types of training and special schools, such as—the industrial high school, extension courses in the high school, the acceptance of correspondence courses toward fulfilling requirements for graduation, coöperative and part time courses and evening schools.

(3) The aims of public education are changing and their scope is being extended. Philosophers, psychologists, sociologists, scientists and educators are collaborating in a statement of the aims of education.

(4) Standards are being developed through educational research for the selection and placement of materials of instruction.

(5) New materials of instruction are being widely used—this is particularly true of the radio and of visual instruction materials.

(6) The specialist is taking a more prominent place in education. There are

now psychologists, psychiatrists, counsellors, research and curriculum specialists, as well as newer types of teachers, e.g., the auditorium teacher and the visiting teacher.

The bulletin contains a very good summary of the growth and development in public education and should prove stimulating to all of the workers in the field.

The Department of Educational Research of the Colorado State Teachers College has recently issued its Third Report on the *Relationship of Intelligence and Classification Test Scores to Mortality and Scholastic Ratings.* The bulletin is entirely too long to present in detail, but the conclusions of the study are:

1. The median scholastic rating was raised from quarter to quarter. For the fall quarter, it was 2.98, for the winter 3.10, and for the spring quarter 3.14. The median for the yearly average was 3.09.

2. On the whole, students with higher intelligence earned higher scholastic ratings.

3. The achievement test shows indications of being of more value in predicting scholastic achievement than does the Thurstone test.

4. Intelligence and achievement tests correlated .7224 ± .0154.

5. Average scholarship correlated .4935 ± .0262 with the Thurstone test and .5522 ± .0433 with the classification test scores.

6. Scholarship correlated .6296 ± .0210 for the fall and winter quarters, .6137 ± .0231 for fall and spring quarters and .6260 ± .0227 for winter and spring quarters.

7. Freshman mortality for the year was 110 students, or 25.1 percent of the 438 students included in the study.

8. Mortality was heaviest in the first decile of intelligence, being 47.5 percent. It was also heavy in the eighth decile, 31.0 percent, and in the tenth, 27.7.

9. A very small amount of information was reported bearing on the direct causes of mortality.

10. Proportionate mortality was higher than for the class of 1931, during the freshman year, being 24.9 percent compared with 23.1 percent.

Mastery of Minimum Essentials in English Grammar

This paper gives the description of a program of work, carried out in the West Allis Junior High School, to determine the place and value of grammar in the junior high school. Its purpose was to increase the pupil's ability to use correct English while in school and later when out of school. This problem is one that grew out of the revision of the English curriculum, which was a part of the general curriculum construction program in progress throughout our whole school system during the last five years.

After much study, it was agreed that the difficulty was three-fold. First, too much material was being taught. Second, the material was poorly graded. Third, the standard of attainment was not high enough. The problem thus fell under the following three heads:

1. The elimination of unnecessary material and the addition of new material.

2. The correct placement of materials.

3. The determination of a standard of attainment which should be reached by all pupils before passing from one unit of work to the next.

The first two problems will be discussed together, as they are naturally part of the same problem. To use the phraseology current in present day school practice the task was to determine the "Minimum Essentials in Grammar for Junior High-School Classes."

The first attack on this problem was made by presenting an itemized list of our own grammar course for Grades 7, 8, and 9 to each of the active teachers in the

English department with the request that it be carefully analyzed and returned with the following information.

a. An indication of those items which in the light of experience should be removed entirely from the junior high-school course.

b. An indication of items that do not appear in the list but which in the light of experience are essential to a grammar course in the junior high school.

c. Arrangement and organization of the essentials so that they would be properly distributed throughout the six semesters.

There were twelve teachers in the English department and this information was requested from each.

The placements made for each unit by each teacher were tabulated and the average placement found. The average placement was made the basis for the placement of the items on the new graded list of essentials. This average placement was determined by using numerical equivalents of grade placements as follows: 7B = 7.5, 7A = 8.0, and so forth. Thus the items were placed according to the average opinion of twelve teachers of the department.

The next step was to divide the entire list into six groups—one for each of the junior high-school semesters.

Table I is a list of the items included in the new grammar course divided and graded as indicated above.

TABLE I

WEST ALLIS LIST OF ENGLISH GRAMMAR MINIMUM ESSENTIALS

7B

1. Sentence (idea)
2. Noun
3. Pronoun
4. Subject (simple)
5. Verb
6. Predicate
7. Skeleton of sentence
   (simple subject)
   (simple predicate)

7A

8. Complete subject (including compound subject)
9. Complete predicate
10. Skeleton of sentence
    (complete subject)
    (complete predicate)
11. Kinds of sentences
    a. Declarative
    b. Interrogative
    c. Exclamatory
    d. Imperative

8B

12. Verb phrase
13. Linking verb
14. Adverbs (simple)
15. Adjectives (simple)
16. Object (direct and indirect)
17. Predicate adjective
18. Predicate noun and pronoun
19. Tense of verbs
    a. present
    b. past
    c. future

8A

20. Prepositions
21. Phrases
22. Conjunctions
23. Clauses
    a. independent
    b. dependent
24. Simple sentence
25. Compound sentence
26. Complex sentence

9B

27. Nouns
    a. Kind
    b. Number
    c. Case
    d. Gender
28. Pronouns
    a. Kind
    b. Number
    c. Person
    d. Case
29. Relative clauses
30. Agreement

9A

31. Verbs
    a. 3 principal parts
    b. 6 tenses
    c. intransitive
    d. transitive
    e. person-number
32. Conjugations—to have, to be, etc.
33. Regular and irregular verbs
34. Verbals
    a. infinitive
    b. participle
    c. gerund
35. Comparison of adjectives and adverbs
36. Active and Passive voice
37. Mood—indicative

These lists of essentials were then checked against the most recent representative courses of study throughout the country at large. Five representative courses were chosen for purposes of analysis. From an analysis of the selected five courses of study a composite course was

drawn up. Each item in this composite course received a composite score determined, as described above, in finding the grade placement for the new West Allis list.

The following list shows the composite score for each grammar item. Any items appearing on the original composite list, and not receiving at least three placements were omitted.

TABLE II

COMPOSITE SCORE AND GRADE PLACEMENT OF THE ITEMS IN THE LIST DERIVED FROM FIVE GRAMMAR COURSES OF STUDY

Item	Composite Score	Grade Placement	
		Composite List	West Allis List
Sentence idea	7	7B	7B
Simple subject	7	7B	7B
Simple predicate	7	7B	7B
Noun	7	7B	7B
Pronoun	7	7B	7B
Verb	7	7B	7B
Declarative sentence	7.1	7B	7A
Interrogative sentence	7.1	7B	7A
Imperative sentence	7.2	7B	7A
Complete subject	7.2	7B	7A
Complete predicate	7.2	7B	7A
Exclamatory sentence	7.3	7B	7A
Adjective	7.3	7B	8B
Adverb	7.4	7B	8B
Phrases	7.5	7A	8A
Clauses	7.5	7A	8A
Adjective phrase	7.7	7A	8A
Adverbial phrase	7.7	7A	8A
Predicative adjective	7.8	7A	8B
Predicate noun	7.8	7A	8B
Direct object	7.8	7A	8B
Auxiliary verbs	7.8	7A	8B
Person and number	7.8	7A	9B
Prepositions	7.8	7A	8A
Nominative case	7.9	7A	9B
Possessive case	7.9	7A	9B
Objective case	7.9	7A	9B
Transitive verbs	8	8B	9A
Compound sentence	8	8B	8A
Conjunctions	8	8B	8A
Personal pronouns	8	8B	9B
Irregular verbs	8	8B	9A
Comparison of adjectives	8.2	8B	9A
Simple tenses	8.3	8B	8B
Simple sentence	8.3	8B	8A
Antecedent	8.3	8B	9B
Active voice	8.5	8A	9A
Passive voice	8.5	8A	9A
Adverbial clauses	8.5	8A	8A
Adjective clauses	8.5	8A	8A
Complex sentences	8.5	8A	8A
Perfect tenses	8.6	8A	9A
Relative pronoun	8.9	8A	9B
Imperative mood	8.9	8A	9A
Indicative mood	9	9B	9A
Subjunctive mood	9	9B	9A
Infinitives	9	9B	9A
Participles	9	9B	9A
Noun clauses	9.2	9B	9A

TABLE III

NUMBER OF ITEMS IN VARIOUS COURSES OF STUDY USED IN THIS INVESTIGATION

	Old West Allis Course	New West Allis Course	City of Middle West	Eastern City	Western City	Southern City 6A = 10	Eastern City
7B	21	7	7	16	7	13	14
7A	9	4	10	8	11	16	10
8B	7	8	8	13	11	11	6
8A	16	7	10	10	8	0	8
9B	8	4	7	0	5	0	4
9A	6	7	13	19	2	0	3
Total	67	37	55	66	44	50	45

For the first twenty-two items there is almost perfect agreement in the average grade placement derived from five courses of study. Beyond the twenty-second item there is less agreement.

The table shows the general tendency to decrease the number of items; the list containing 66 items is five years old.

The second problem of this study was the determination of standards of attainment for junior high-school pupils. It was decided that mastery should be the goal. Our Junior High School is sectioned into ability groups. For upper groups mastery was interpreted as 90 percent achievement, for the average groups 85 percent achievement, and, for the lower groups 80 percent achievement. While it is readily seen this is not complete mastery (100 percent) it is evident at once to all school people that this is a great deal nearer mastery than is ordinarily required. It must also be noted that, for example, this is not 90 percent on daily work but 90 percent achievement as measured at the close of the semester, and further that this 90 percent achievement was to be required of pupils not only on their own material but on all material given prior to their grade.

The introduction of this latter requirement as to back material was made gradually. For the first semester, 7A and 8B did the same work which included 7B

FUNDAMENTALS IN ENGLISH GRAMMAR

I. *Sentences*

A. Write a definition for the sentence:

Score

(*Sentence is a group of words expressing a complete thought.*)
(Idea but not exact words necessary.)

2 B. Some of the following groups of words are sentences and some are not. Put an X on the line following each of the groups that is a sentence.

1. The children played in the orchard	(X)	
2. Before the party was over	_____	
3. Children, men and women	_____	
4. We shall have turkey for dinner	(X)	
5. He was given a dollar for his work	(X)	
6. People came from all parts of the city	(X)	
6 7. On a beautiful morning	_____	
8. He gave meat and drink to the man	(X)	
9. The silent city would soon	_____	Scored:
10. Many people saw the game	(X)	Wrong subtracted from right

C. Write five sentences

1.
2.
5 3.
4.
5.

(Must fulfill definition)
(Capitals or punctuation not required)
(Misuse of words and spelling ignored)

work; the following semester 8B and 8A did the same work which included 7B, 7A, and 8B work and so forth.

Achievement was measured by an objective test covering item for item, the work done in each grade, and 90, 85, and 80 percent achievement was interpreted as being 90, 85, and 80 percent achievement on the test. Below is an illustration of the tests used.

The key was objective. The English teachers agreed on the ideas that must be contained in the definitions. It was decided to give a pre-test in September and the results to be placed in the hands of the teachers. A mid-semester test was given to show what progress had been made. A third test was given at the close of the semester. Tables IV and V give the results.

It will be seen that the goal was reached with very little more failure than ordinarily takes place. Out of the 1119 pupils included in the study only 8 percent failed to get through in January, the end of the semester. The failure was, of course, the largest in the low ability groups even though the standard was made lower for these groups.

Two things must be remembered. First, there are no figures to show the gain by individuals. That is, although there is

TABLE IV

RESULTS OF THE THREE TESTINGS FOR THREE ABILITY GROUPS GRADES 7B-9A

Grade	Ability	Percent Mastery-goal	Percent Reaching Goal 1st Test	2nd Test	3rd Test
7B	High	90	—	85	96
	Average	85	—	72	95
	Low	80	—	60	93
7A	High	90	60	96	99
	Average	85	25	81	100
	Low	85	11	90	96
8B	High	90	21	96	99
	Average	85	33	84	97
	Low	80	19	67	79
8A	High	90	8	45	90
	Average	85	4	65	72
	Low	85	2	34	82
9B	High	90	19	81	97
	Average	85	27	82	100
	Low	80	12	55	77
9A	High	90	14	62	86
	Average	85	5	40	82
	Low	80	11	55	78

TABLE V

SUMMARY OF RESULTS FOR THREE TESTINGS GRADES 7B-9A

Grade	Number of Pupils	Possible Score on Test	Percent Reaching Mastery Goal Set 1st Test	2nd Test	3rd Test
7B	244	83	—	77	94
7A	188	125	28	95	98
8B	257	125	25	85	92
8A	140	210	5	49	83
9B	197	226	22	78	95
9A	93	298	11	55	83
All grades	1119	83–298	15	77	92

little or no gain shown in the percentage reaching goal in some classes between November and January, most pupils in these classes raised their actual score. Second, teachers were instructed that when they knew their pupils had reached the goal they could spend their time on literature. Much time, in some classes, was spent on literature work. This was particularly true with the 7th grade and the pupils in the upper classes.

A vindication of our procedure and of the conclusions leading to this procedure may be seen from the tables. For instance, in Table V it will be seen that only 11 percent of the 9A pupils had anything approaching mastery of this minimum essential material at the outset of the semester. These people would next semester be in Senior High School and their formal grammar was, supposedly, complete! Is it any wonder our pupils cannot use correct grammar when they leave school?

The experiment was continued the following semester and has passed now into accepted practice in our Junior High-School grammar course of study. The standard is being maintained and the teachers in Senior High School are already bearing witness to the fact that the pupils now seem to really know and are able to use, at least, some of the grammar facts.

H. B. NASH AND FRED R. BUSH
West Allis Public Schools

TO WHAT EXTENT DO GRADES INFLUENCE STUDENT RATINGS OF INSTRUCTORS?

The answer to the question propounded in the above heading attains major significance if it should be found that there is a significant relationship between school marks and student ratings of instructors. There have been recently published several studies of instructorial traits related to success in teaching.[1] If it should turn out that ratings by students reflect in any considerable degree the grades assigned to them by the instructor, one might arrive at the somewhat surprising conclusion that to improve one's teaching it would be merely requisite to change one's policy in grading! This is on the assumption, of course, that student ratings are a valid criterion. It is not proposed here to argue the validity of such a criterion. For such a discussion the reader is referred to the article by Brandenburg and Remmers cited in footnote 1.

The study here reported undertook to obtain data to answer the question of the relationship between grades and student ratings of instructors for high-school and college students. The ratings were obtained by means of the Purdue Rating Scale for Instructors,[2] which provides an anonymous graphic rating of the instructor on the ten traits listed in Table I.

In order to keep the ratings uninfluenced by any knowledge on the part of the student as to the purpose of the ratings, they were obtained in the usual anonymous way. When the ratings had been completed, however, the names of the students above the class average in

[1] See for example Champlin, Carroll. "The Preferred College Professor." *School and Society*, XXVII, (1928), pp. 25-37; Breed, F. S. "Factors Contributing to Success in College Teaching." *Jour. Educ. Research*, XVI, (1927), 247-253; Brandenburg, G. C. and Remmers, H. H. "Rating Scales for Instructors." *Educ. Adm. and Superv.* XIII; (1927), pp. 459-466; Remmers, H. H. and Brandenburg, G. C. "Experimental Data on Purdue Rating Scale for Instructors." *Educ. Adm. and Superv.* XIII, (1927), pp. 519-527.

[2] Published by the Lafayette Printing Co., Lafayette Ind. For detailed analysis of the Scale see "Manual for the Purdue Rating Scale for Instructors."

TABLE I

CORRELATIONS OF STUDENT RATINGS VS. SCHOOL MARKS FOR DIFFERENT INSTRUCTORS

	High-School Instructors (Senior Practice Teachers)							College Instructor	
	A	B	C	D	E	F	G	H	
	N=21	N=25	N=15	N=23	N=24	N=24	N=22	N=28	N=33
Interest in Subject	+.237	—.029	+.357	+.042	+.219	+.299	+.249	—.341	+.398
Sympathetic Attitude toward Students	+.159	+.240	+.357	+.308	—.007	+.533	—.059	—.383	+.030
Fairness in Grading	+.089	—.218	+.467	.296	+.425	+.258	—.091	—.201	+.232
Liberal and Progressive Attiude	+.286	—.069	—.123	.100	+.425	+.257	—.021	—.124	+.305
Presentation of Subject Matter	—.393	—.098	+.229	—.136	+.296	+.218	—.173	+.228	+.254
Sense of Proportion and Humor	—.096	—.153	+.133	.014	+.225	+.321	—.367	+.037	+.354
Self-reliance and Confidence	—.223	.—152	+.131	—.009	.000	+.125	—.416	+.106	+.229
Personal Peculiarities	—.100	+.261	—.204	.375	+.063	+.447	+.256	—.321	+.366
Personal Appearance	—.254	—.196	+.161	.370	—.043	+.106	—.019	—.054	+.119
Stimulating Intellectual Curiosity	+.241	—.268	+.229	.567	—.114	+.561	—.189	—.178	+.169
Total	—.125	—.086	+.251	.226	+.270	+.453	—.154	—.191	+.214
Average	—.0345	—.0883	+.174	+.193	+.149	+.313	—.083	—.142	+.246

	College Instructors								
	I		J			K			Av.
	N=27	N=16	N=17	N=32	N=24	N=27	N=22	N=29	
Interest in Subject	—.137	+.243	+.001	—.185	—.510	—.050	—.097	—.196	+.029
Sympathetic Attitude toward Students	—.140	+.537	+.078	—.063	—.286	+.065	—.100	+.116	+.081
Fairness in Grading	—.172	+.436	+.594	—.122	—.559	+.522	—.544	+.202	+.095
Liberal and Progressive Attitude	+.006	+.630	+.890	—.105	—.066	—.126	+.119	+.072	+.144
Presentation of Subject Matter	—.118	+.036	—.086	—.093	—.860	—.284	—.362	+.214	—.066
Sense of Proportion and Humor	—.069	+.264	+.296	+.063	—.289	—.067	—.160	+.516	+.060
Self-reliance and Confidence	—.366	+.231	+.131	+.177	—.509	+.069	—.099	+.481	+.019
Personal Peculiarities	—.467	+.088	+.203	—.022	—.157	—.025	+.378	+.054	+.070
Personal Appearance	—.047	+.432	+.383	—.109	—.171	.000	—.402	+.207	+.023
Stimulating Intellectual Curiosity	—.006	+.268	+.362	—.231	—.243	—.143	+.308	+.190	+.090
Total	—.234	+.384	+.451	—.079	—.711	—.053	+.139	+.431	+.070
Average	—.152	+.317	+.285	—.075	—.365	—.039	—.096	+.186	+.046

Table II gives the P. E.r for various populations and r's, to enable the reader to estimate the P. E. for any given r in Table I.

TABLE II

P. E. OF BI-SERIAL R COMPUTED FROM THE FORMULA,

$$\text{P. E.} = .6745\left(\frac{\sqrt{pq} - r^2}{z}\right) \qquad \text{WHERE } pq = .2500$$

$$\sqrt{N}$$

Number of measures	Correlation coefficient r						
(N)	.000	.100	.20	.30	.40	.50	.60
10	.267	.265	.259	.248	.233	.214	.191
15	.218	.217	.211	.203	.190	.175	.156
20	.189	.188	.182	.175	.165	.151	.135
25	.169	.168	.166	.157	.147	.135	.120
30	.154	.153	.149	.143	.135	.124	.110
35	.143	.142	.138	.133	.125	.114	.102
40	.134	.133	.129	.124	.117	.107	.095
100	.085	.084	.082	.078	.074	.068	.060
150	.069	.068	.067	.064	.060	.055	.049
200	.060	.059	.058	.055	.052	.048	.043
250	.053	.053	.052	.050	.047	.043	.038
300	.049	.048	.047	.045	.043	.039	.035
350	.045	.045	.044	.042	.039	.036	.032
400	.042	.042	.041	.039	.037	.034	.030

grades were read off, with the request that they mark an X at the top of their papers. The results from this procedure made possible the computation of the coefficient of correlation between grades and ratings by means of bi-serial r[3]. The formula used was Kelley's formula 201,

$$r = \frac{(M_1 - M_t)pq}{\sigma z}.$$

The P.E.$_r$ was derived from Kelley's formula 204,

$$\sigma_r = \frac{\left(\frac{\sqrt{pq - r^2}}{z}\right)}{\sqrt{N}}.$$

The data for 7 practice teachers (Purdue seniors) and 4 college instructors are given in Table I. The row marked "Total" was obtained by adding the ratings on each trait and correlating the result with grades as before. The row marked "Average" contains the average r's for traits 1 to 10 inclusive.

Since the r's in the row labeled "Total" in Table I are based upon ten different traits measures, the P.E.'s for this row of r's can be estimated from the value of 10N for a given instructor. For example, instructor A has 21 students, and the "Total" r is —.125. 10N = 210, which gives a P.E.$_r$ of approximately .059.

It is obvious that very few of the correlations deviate sufficiently from zero to be significant. There are some interesting individual variations among instructors (See, for example, instructors F and J) but on the whole the data are impressive chiefly for the lack of correlation. The average r for the entire table is only +.049. If we estimate the average reliability of school marks and of the ratings to be +.70 (a conservative estimate) the total average correlation when corrected for attenuation[4] rises to only +.070.

[3] See Kelley, T. L. *Statistical Method*, pp. 245-249.

Summary and Conclusion

Correlation of grades against student ratings for 409 students under 11 different instructors in 17 different classes varying widely in subject matter gives correlations for individual traits of individual instructors varying from —.860 to +.890. The correlations when averaged by traits vary from —.066 (Presentation of Subject Matter) to +.144 (Liberal and Progressive Attitude). The average of all correlations is only +.070 at most. The conclusion seems inescapable, therefore, that for the average instructor and the average student there is practically no relationship between the student's grades and his judgment of the instructor as recorded on the Purdue Rating Scale for Instructors.

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The Relation of Pupil Achievement on Oral True-False Questions to Achievement on the Same Questions When Written

The keeping of a daily record of pupil achievement seems to be an acknowledged valid basis for awarding grades. It was found that a series of ten-statement true-false tests given orally furnished a convenient and practicable method for obtaining such a record. (By "given orally" it is meant that the statements were read by the teacher and the pupils simply wrote their answers—plus or minus—on their papers.)

Some of the pupils, however, complained about the statements being given orally. There were a few who main-

[4] Kelley, *op. cit.*

tained they could do better if they had written statements with which to deal. Hence, this experiment was conducted to determine whether or not the pupil achievement on oral true-false statements is significantly different from that on the same statements when written.

The following steps were taken to secure experimental conditions which would lend validity to the results:

I. As to the subjects.

a. Forty pupils were divided into two groups of equal ability as determined by grades on three quarters' work in Biology.

II. As to material.

b. True-false review statements were used in Biology. Four sets of one hundred questions each were drawn up. A directed review period of one week over the ground covered by the particular test preceded the administration of each set. The pupils of both groups were studied together.

III. As to administration.

a. One group took the statements orally and the other was supplied with the same statements mimeographed. On the next set the groups changed tests.

b. Both groups worked at the same time. The group taking the written test, however, always worked in the study hall (under adequate supervision for good working conditions), while the group having an oral test always worked in a classroom. There were no board materials, charts, apparatus, etc., which might give clues. The oral statements were always read by the same person.

c. The actual testing period, as a whole, was preceded by one in which at least twenty tests of each type—oral and written—were given to the pupils. The purpose was not only to insure ample acquaintance with each type of test but also to give the teacher opportunity to standardize his administration. It was felt that this would be especially desirable with the oral tests where it was so necessary to read understandably without "reading in" the answers. (Incidentally, despite careful surveillance, none of the somewhat expected "give aways" were observed.)

IV. As to grading.

a. All papers were graded on the "number right minus the number wrong" basis.

The results are shown in Table I.

TABLE I

	Test I	Test II	Test III	Test IV	Total
Average score (written test)	56.9	58.4	62.5	71.8	62.4
Average score (oral test)	55.9	60.4	66.6	70.7	63.2
Difference	1.0	2.0*	4.1*	1.1	0.8*
Probable error of mid score	1.54	1.43	1.48	1.65	.79

*Denotes difference in favor of oral method.

On two tests the group working with oral material made the better showing. On the other two the written material group showed to better advantage. As for the significance of the differences—the chances are four to one that the true value lies within two probable errors of the mean score. Hence this difference of two probable errors is about as small as could be credited with significance. It is found in only one of the four tests and in favor of the oral material. The total averages showed a difference of 0.8 in favor of the oral material, which is insignificant in view of the probable error of .79.

The length of time required for administering the two types of test were noted. Pupils were requested not to dally over their papers, but to turn them in as soon as they had done their best, and were informed that the length of time was being watched. They knew, however, that the time itself would not count on their grades.

The results are shown in Table II.

TABLE II

	Test I	Test II	Test III	Test IV
Time to administer oral test	35'	34.5'	38.5'	30.5'
Time to administer written test (average)	20.3'	21.5'	19.3'	22.6'
Difference	14.7'*	13 '*	19.2'*	11.9'*

*Denotes in favor of written test.

There is considerable difference in the time required for the administration of the two types of test. All the difference is not real gain, however, for the written work would have to be left with the class as a whole for a longer time than that given above as average for the class. Moreover, the above is the difference on a one hundred question examination. On the shorter daily quiz the difference would be proportionately less striking.

On three of the four tests correlations were made between the time taken by respective pupils for the written tests and the grades they received. Correlations were calculated by the Pearson product moment formula.

There was one subject whose performance was so entirely unusual that a second set of correlations was made in which his scores were omitted. This pupil consistently had the lowest score, and he also took the longest time. His performance in all subjects throughout the year suggested some fundamental deficiency. It seems quite possible that the "adjusted results" approach the truth for the average class more closely that the "experimental results" which are affected by this strikingly exceptional case.

Calculations were made so that as those making the better scores took the longer time, the correlations would approach one.

Results are shown in Table III.

TABLE III

	Experimental Results (r between length of time taken and grade received)	Adjusted Results (r between length of time taken and grade received)
Test I	—.28 ±.15	.16 ±.16
Test III	—.31 ±.14	—.13 ±.16
Test IV	.04 ±.16	.04 ±.16*

*The exceptional pupil was in the oral section.

Conclusions:

1. This experiment indicated no significant difference between the pupil achievement on true-false statements when given orally and the achievement on the same statements in written form. The inconclusive difference which appeared favored the oral method.

2. This experiment indicated difference in time taken for administering the two types of tests, but the time does not seem to be a great enough factor in deciding for or against the use of either form. Especially would this be true on the short true-false quiz.

3. This experiment indicated no correlation between the length of time taken by a pupil and the grade received on true-false statements.

The chief result of this experiment—namely, that there is no difference in achievement on true-false statements given orally and in written form—is not a result that would be likely to suggest itself beforehand. Regardless of whether or not the result may be unexpected, however, it is the purpose of this paper to put down the experimental data rather than to explain it. It should not be amiss nevertheless, to set down a clue to an explanation which was furnished by some of the pupils themselves when they said,

"We can do better on the oral questions because that way we think just about the question being asked and don't get all mixed up by a whole sheet of different questions before us."

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THE NATIONAL SURVEY OF SECONDARY EDUCATION

The nation-wide survey of secondary education for which Congress authorized an appropriation of $225,000 and appropriated the first installment of $50,000 for the fiscal year 1930, is proceeding steadily under the direction of the Commissioner of Education. Dr. F. W. Koos has been appointed to give his full time and attention to the project in the capacity of an expert assistant. The consulting committee of nine experts appointed last October has met, organized, and defined the field of work. At its meeting on November 25, 1929, the Consulting Committee on the National Survey of Secondary Education met in Washington and adopted the following recommendations bearing upon the conduct of the Survey:

By vote the committee made the following recommendations:

1. That primary investigation be conducted in the following fields:

Organization of secondary schools
Student personnel problems
Administrative and supervisory problems in secondary education
Administrative and supervisory staff
Curriculum activities
Extra-curriculum activities

2. That no primary major investigations be organized in the following fields:

Historical development of secondary education
Objectives
School housing
Teaching staff
Financial aspects

These eliminations were made primarily because of financial limitations of the survey.

3. That no detailed study of foreign school systems be undertaken.

4. That the Commissioner of Education appoint a committee of persons not engaged in education but representative of views of the citizenry regarding education. Representations of organizations such as the American Federation of Labor, the U. S. Chamber of Commerce, the National Grange, and service clubs such as Rotary, Kiwanis, and Lions was mentioned. Emphasis was placed upon the necessity for making this committee truly representative of the lay attitude. The committee thus selected would have presented before it and would pass upon non-technical (primarily organizational) aspects of education uncovered in the survey.

5. That the regional associations be requested to coöperate in the survey projects to be initiated.

6. That reactions regarding important and feasible investigations in the curriculum and in extra-curriculum activities be secured from experts in these two fields.

7. That it be a major function of the survey to develop in detail the procedures and techniques for appraising secondary school procedures which may be used:

a. To enlist the effective coöperation of outside agencies in conducting the survey

b. To furnish examples of effective inquiry which may be applied locally after this survey is completed.

Since the meeting of the Consulting Committee the Secretary of the Interior has selected a group of advisers consisting of some thirty educators to assist the survey staff in combing the nation for information. In the near future, a second group consisting entirely of laymen will be chosen. To this group will be presented the work of the survey commission as it proceeds, and they will criticise it from the point of view of the

average citizen. Both the educators and the laymen will review the final reports.

The personnel of the advisory group represents all sections in the United States, as well as a large variety of educational interests. In it are specialists in state-school administration, city-school administration, state-university administration, relations of colleges and secondary schools, relations of elementary and secondary schools, Negro education, the junior high school, the senior high school, the junior college, the large city high school, the small high school, high-school libraries, the curriculum, extra-curriculum activities, school counseling and guidance, and vocational education.

The following persons constitute the adviser group:

E. J. Ashbaugh, Dean, School of Education, Miami University, Oxford, Ohio.

John L. Clifton, State Director of Education, Columbus, Ohio.

R. L. Cooley, Director, Milwaukee Vocational State, Milwaukee, Wis.

Philip W. L. Cox, Professor of Secondary Education, New York University, New York.

Jesse B. Davis, Professor of Secondary Education, Boston University, Boston, Mass.

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Will C. French, Associate Supt. of Schools, Tulsa, Okla.

John M. Gandy, President, Virginia Normal & Industrial Institute, Petersburg, Va.

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Arthur Gould, Asst. Supt. of Schools, Los Angeles, Calif.

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Michael H. Lucey, Principal, Julia Richman High School, New York, N. Y.

A. Laura McGregor, Vice Principal, Washington Junior H. S., Rochester, N. Y.

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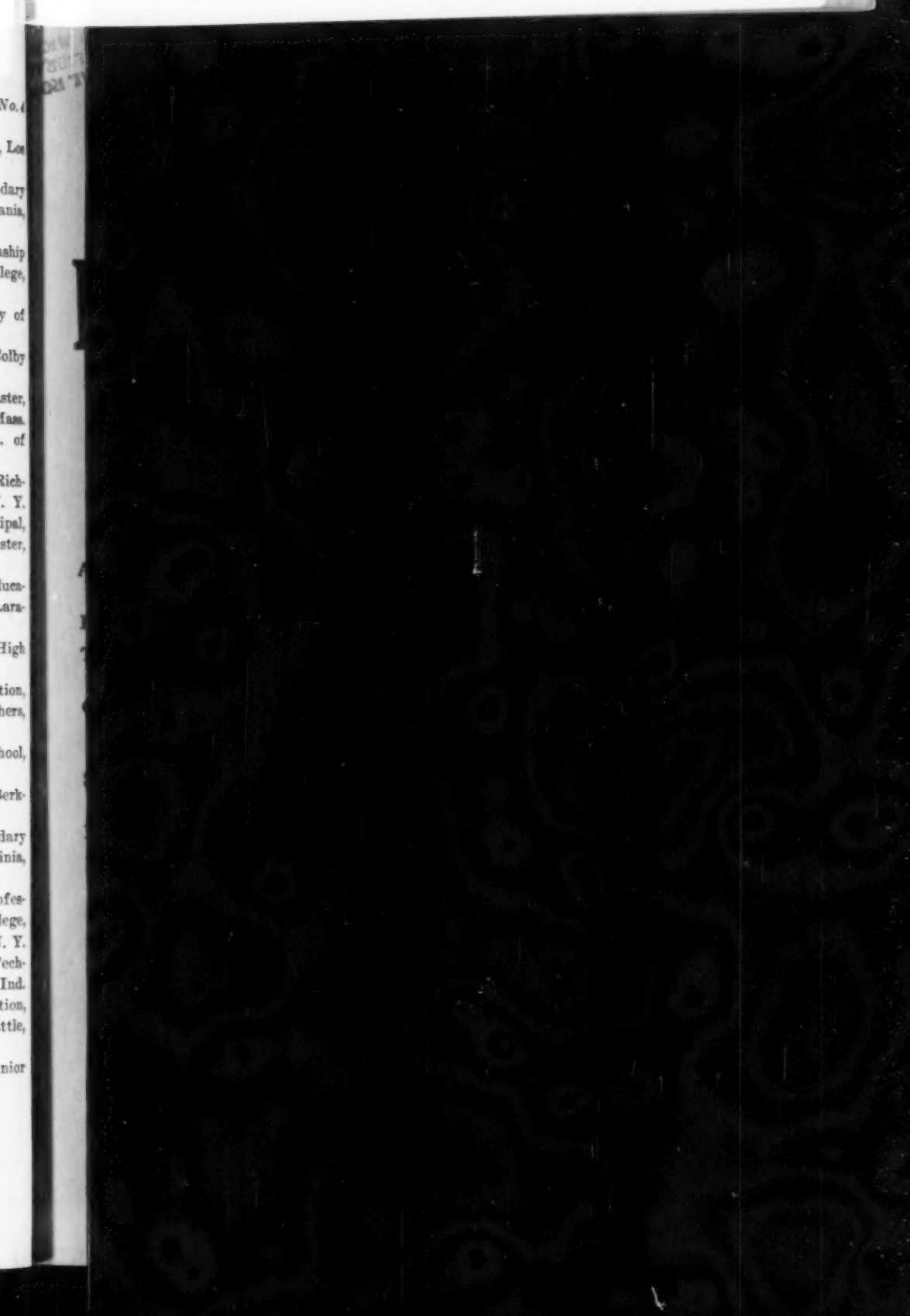
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